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ALL ABOUT CINNAMON;

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1995

PRACTICAL INSTRUCTIONS

FOR

Planting, Cultivation and Preparation for Market,

WITH

INFORMATION FROM A VARIETY OF SOURCES.

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ALL ABOUT CINNAMON.

Whatever doubt there may be of other products, such as cocoanut and palmyra palms, there can be none about cinnamon being indigenous to Ceylon, for large trees are scattered through the oldest forests of the interior, and these blaze out at certain seasons of the year in every shade of pink, from faint-rose to blood-red; nowhere else too does this cultivated shrub grow so well as in Ceylon. The island has been famous for its spice from the dawn of historical records,[*] and all through the Portuguese and Dutch periods cinnamon is referred to as a principal source of wealth.[†] The Dutch, under Governor Falck, first commenced the systematic cultivation of cinnamon in 1767-70 against the advice of the Sinhalese Headmen, who said regular cultivation would ruin the tree, crops and quality! (See Bennett.) The Dutch restricted the cultivation of cinnamon to Ceylon, of the clove to the Moluccas, and of the nutmeg to the Banda islands. Before 1767, they depended on the supply of jungle spice from the territories of the Kandyan King. They then formed the Kadirana, Ekela, and Maradana Gardens between Colombo and Negombo as well as the Moratuwa and Beruwala Gardens, covering altogether 15,000 acres, together with gardens near Galle and Matara from 15 to 20 miles in circumference. Between that time and 1832 the cinnamon trade was a monopoly of the Dutch and British Governments, but the cultivation and trade have now for about 60 years been free. Cinnamon was the leading article of the export trade even in British times until forty years ago, when it was deposed from this pre-eminence by coffee and coconut oil.

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[*] The Romans communicated with India once a year in the time of Augustus, investing the equivalent of £403,000 sterling in the trade, and calculating the profit at 100 per cent for each voyage. Goods were carried up the Nile in ships, thence across the desert on camels for the Red Sea, then across to a port of Arabia where Indian merchants were met and exchange took place. The most important article from India was cinnamon, which (according to a writer in the Asiatic Journal) sold for £8 sterling per lb. in Rome. The "odours" of the far-famed cinnamon spice came by a poetical liberty to be associated with "Araby the blest" through the system of transit by caravans being arranged overland through Arabia. Tennent throws some doubt on even Cinnamon being indigenous, speaking of it as being introduced from Africa and not being mentioned in early native records.

[†] In 1506, the Portuguese found cinnamon only in its wild state, but the Sinhalese king who lived at Cotta contracted to pay an annual tribute of 250,000 lb. of cinnamon in return for the protection of the Portuguese; 3,000 lb. of pepper and cinnamon was the present sent by the Kandyan king to the King of Holland in A.D. 1602. In 1738 the Dutch, however, exported 600,000 lb. to India, Persia, and Europe, the value being from 8s 4d to 17s 8d per lb.—Another report says the Dutch about 1750 exported to Europe 6,000 bales, India 1,600, Persia & Red Sea, &c, 400=8,000 bales of 100 lb. each.

In the old days of the monopoly and high export duties (2s to 3s per lb. in 1832; 2s to 2s 6d in 1844; 1s in 1846; 4d in 1848; 2d in 1853; free in 1860) the quantities supplied by Ceylon of the fragrant bark for the world's consumption seldom reached half-a-million of lb. In early British times 320,000 lb. were annually exported costing £40,000 leaving a profit of £9,000.* In competition with the Cassia lignea of China and the true cinnamon (coarser than Ceylon, superior to Malabar) grown in Java (the cultivation of which by the Dutch, who commenced it in 1825, our monopoly and export duty policy had fostered), the trade was slipping away from us, until in 1842 the export went down to 121,000 lb. With the selling of the Government gardens and the adoption of a different policy in free trade, there was then a great rebound, and the round million pounds was for the first time attained (and exceeded by 57,000 lb.) in 1844. This export was too much for the consuming market, and the old average of about half-a-million pound prevailed for the next ten years. The average then ranged about 800,000 lb. until, in 1867, it seems to have been discovered that it would be profitable to export the chips which had hitherto been used for the distillation of cinnamon oil. There was then a regular rush into the trade, until, in season 1868-69, what with chips and baled spice, the enormous quantity of 2,818,326 lb. was exported. This was the culminating point. The rubbish which was sent from the Island brought the chips into disfavour, but after that, for a time, the tendency was downwards in the quantity sent way. The exports in fact, diminished, until the average, instead of being 1,864,000 lb.(figures for the five years ended 30th September 1873) was only 1,350,000 between 1873 and 1878, but in the latter year the export rose again until in 1881 it was over 1,800,000 lb. and in 1882 close at the 2 million lb., a figure which is thought beyond what can be safely counted on for profitable consumption. The consequence is that the price has gone down until the Cinnamon cultivators, nearly all Ceylonese, declare there is no margin of profit, and yet their exports still go on increasing, more particularly of "chips," although a native representative Association agreed in 1883-4, that the preparation and export of chips should be given up! Another grievance of the Ceylon exporters was found in the London quarterly sales, and these were accordingly made monthly. but no improvement in prices took place, on the contrary the average price per lb. now is far below what it was a short time ago. Quarterly sales in London have been resumed.

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* One report says that in 1815 as much as 9,000 bales were collected in the Kandyan Kingdom chiefly and from 1815 to 1821 the harvest was valued from 4,000 to 7,000 bales a year of 100 lb, each.

Later on (towards the end of 1889) a special effort through the exertions of Mr. Jardine, was made to give up making and shipping chips; but the export returns only showed signs of abatement for the one year 1890:—

			Bales and Chips.	Local Customs Value.
Exports in the calendar year		1850	lb. 665,000	R645,000
Do	do	1873	1,160,754	580,370
Do	do	1876	1,356,901	678,480
Do	do	1882	1,992,604	996,300
Do	do	1885	2,145,257	1,072,630
Do	do	1887	2,046,153	1,023,070
Do	do	1888	2,040,589	1,020,290
Do	do	1889	2,562,711	1,281,350
Do	do	1890	2,345,564	1,172,780
Do	do	1892	2,642,449	1,321,224[*]
Do	do	1893	2,741,083	1,096,433
Do	do	1894	2,784,754	1,113,902
Do	do	1895	3,052,000	1,220,800
Do	do	1896	3,182,823	1,273,129
Do	do	1897	3,850,005	2,194,503
Do	do	1898	4,281,165	2,440,264
Do	do	1899	5,501,096	2,760,692
Do	do	1900	4,295,856	2,540,455

The above export for 1900 included 1,850,812 lb. of chips, and it is apart from 310,252 lb. "wild" Cinnamon valued at R9,307·56 or 3 cents a lb.

If there were only a profitable demand, the export from Ceylon could be kept steady, at about 2¾ million lb. of baled cinnamon; but in their own interests the Ceylon cultivators should limit the shipments of "chips" (rather utilizing them to distil cinnamon oil from them) for if the export were restricted to bales of good bark only, the prices would be much better. It was feared that the unsettled and very far from prosperous state of Spain with its foolish war with the United States, might affect the price of cinnamon; but strange to say the disturbance of the market was limited. Spain is the great manufacturer and consumer of chocolate creams in which cinnamon spice is largerly used, as also for incense in the cathedrals and churches of all Roman Catholic countries especially.[†] There is practically no limit, except that of profitable demand, to the quantity which this Island could supply. The best plantations, formed on a soil composed mainly (up to 90 per cent of pure silica) of snowy white siliceous sand (deposited, probably, from freshwater lakes), are near the sea-coast a little south of Colombo, around the city, and northwards to Negombo. But bark of a fair quality is got from jungle bushes in the hill forests, and some years ago when the price was better, cinnamon was planted not only by the native Kandyans but by coffee planters in Dumbara, Hantane, Nilambe, Dolosbage, Matale, Laggala, and other districts. It was believed that exhausted coffee land could be utilized for this culture, at elevations up to 2,500 feet or so, and the return of about £3 to £3 10s an acre was always useful as an addition to the income from coffee, while the appearance of plantations was improved by occupying unsightly blanks: there are still 6,546 acres included in our planting district returns as under cinnamon, but nearly all in low-country divisions. In the low-country, Europeans have generally withdrawn from the cultivation, only about 2,000 acres out of a total of perhaps 40,000 acres of cultivated cinnamon, being held by them, while the native have bought fresh land and extended cultivation. Up to 1860 cinnamon proprietors could barely hold their own against competition from Java, but a few years later a great turn came, and an estate, which in 1861 could be got for £2,000, in 1873 sold for £9,500; another bought for £6,000 in 1867, was sold for £17,000 in 1870, all owing to the rise in the price of cinnamon by 50 per cent in 1868. Since then, properties have fallen in value. Cinnamon bushes 100 years old in Ceylon still bear where cultivated as good crops as ever, and the same soil has grown cinnamon for perhaps 2,000 years. The average yield is from 100 to 125 lb. per acre. Really fine cinnamon, such as Ceylon only can produce in perfection,* still commands the highest price;† but

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[*] The Colombo Customs valuation was in 1892 40 cents, but is now 57 cents or about 9½d per lb. with exchange at 1s. 4d.

[†] Inferior cinnamon chips especially are used freely in condiments and in the preparation of such manufactures as Thorley's food for cattle, &c. It has been pointed out that "cinnamon freights" from Colombo are not regulated fairly. A press correspondent writes:—"At present the producer has to pay for 800 lbs. as a shipping ton. This was all very well in the old days when small quantities of the spice were taken as cabin freight, but now-a-days, when thousands of bales are shipped, often by one steamer, it is time for an

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alteration. Eight hundred bales of cinnamon make 100 shipping tons measuring some 3,000, or at the outside, 3,500 feet if stowed in bulk, while 100 shipping tons, of coffee measure over 6,000 feet, and even after allowing for broken stowage, over 5 500 feet. As the difference in freights between cinnamon and coffee is only 5s a ton, say that 100 shipping tons of coffee occupying 5,500 feet, are taken at 55s per ton, the total freight is only £275, against £250 paid for only 3,000 to 3,500 feet occupied by the 100 tons of cinnamon. Again, cinnamon chips are put on the same tonnage footing as if they were cabin freight, viz, 800 lbs. to the shipping ton, although they are always used as broken stowage." The Ceylon Chamber of Commerce published a new Tonnage Scale some years ago in which certain changes were made for cinnamon, 1,200 lb. being allowed to the ton for cylindrical bales and 800 lb. in bags or unpressed bales, with 50 c. feet in cases or machine pressed bales.

* In Ceylon the principal and only cultivated species is distinguished above all others by the Singhalese name of *Penné* or *Kassé Kuroondu*, which signifies honey or sweet cinnamon; the second variety is called *Naya Kuroondu*, or snake cinnamon; the third *Kapooru Kuroondu*, or camphor cinnamon; the fourth, *Kabatté Kuroondu*, or astringent cinnamon; the fifth, *Sevel Kuroondu*, or mucilaginous cinnamon; the sixth, *Dowool Kuroondu*, or flat or drum cinnamon; the seventh Nika Kuroondu, or wild cinnamon, whose

cinnamon, after all, is only a luxury, not an absolutely necessary food like coffee, or even of such economic value as the product which is as yet the second great staple (value being considered), coconut oil. The local consumption of cinnamon is comparatively trifling, certainly not more than 100,000 lb. Colombo District has about 13,000 acres cinnamon; Negombo 20,000. There has been an extension of cultivation of recent years in the Galle (total about 5,225 acres), Matara (700 acres), and Kalutara (now 5,522 acres total) districts, as also in Kegalla (300 acres). In the Eastern Province there is still a good deal of cinnamon. The Blue Book shews 38,381 acres under cinnamon. Evidently the total area (with patches in the Central and N.-Western Provinces) is not much under 45,000 acres. In our Directory only 18,762 acres are entered for regular plantations.

Many of the Chaliyas (Sinhalese caste of cinnamon-peelers) from the neighbourhood of Galle were accustomed, while prices were good, to migrate at a certain period of the year to the Central Province to cut cinnamon in the forests, generally contracting with the planters for the produce where growing on private properties. It was expected that the same class of people would be found very serviceable for the barking of cinchona, but they proved unwilling to work as day labourers save at exorbitant rates of wages.

Cinnamon in some of its varieties, probably a kind of Cassia, is said to be indigenous in Cochin China, and a good deal is exported, but the preparation is not equal to that of the Ceylon spice. A great deal of Cassia is produced in China, about 11 million lb. being annually exported, chiefly to Britain, for re-exportation, however, to the Continent. Money says that the Dutch derive little profit from cinnamon in Java: the bark is peeled and dried by natives and sold to Government; four Residents supervise the gardens. We find cinnamon growing besides on the Malabar coast of India, Sumatra, Manila, and the Eastern Archipelago generally, Cayenne, Leeward Islands, Bourbon, and in small quantities in Brazil and the West Indies. Cinnamon is being tried with some success in Northern Queensland. The use of inferior cassia imported from China and the Eastern Archipelago has much interfered with the demand for Ceylon cinnamon.

Dr. Trimen, in his Report for 1882, refers as follows to the Cassia of China—a rival of Ceylon Cinnamon though inferior in the bark:—"*Chinese Cassia lignea*:—To Mr. Ford (Superintendent of the

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leaf resembles that of the nicasol, or *Vitex Negundo*; the eighth, *Mal Kuroondu*, or bloom or flower cinnamon; and the ninth, *Tompat K.* or trefoil cinnamon. But only the first four are strictly varieties of the *Laurus Cinnamomum.—Bennett's "Ceylon and its Capabilities."*

[†] The average price in London gradually fell from 8s in 1830 to 5s 1d in 1841, to 1s 6d in 1875 rising to 2s 2d in 1878, but down again in 1883 and on to 1885 and 1891, and later to little more than 1s 2d per lb. at which rate, the cost of cultivation and careful preparation is scarcely covered. Since 1897 prices have risen to 1s 6d and 1s 10d for finest.

Botanic Garden at Hongkong) the Gardens are indebted for sending (with the consent of the Secretary of State and the Government of Hongkong), a Wardian case of young plants of *Cinnamomum Cassia*, the plant affording the 'Cassia lignea' of commerce. Eighteen of these have been planted at Péradeniya, and some sent to Hakgala for trial. The plants seem very hardy. These were collected by Mr. Ford himself from the plantations on the West River in the province of Kwangtung, South China, where an immense cultivation is carried on. Like our Ceylon cinnamon, the precise plant is not known wild, but is probably a cultivated race of some common wild species. By this visit Mr. Ford has satisfactorily determined that this is the sole source of 'Cassia lignea,' which has been hitherto supposed to be derived from a number of species of *Cinnamomum*. The export of this product from Canton in 1878 reached the enormous quantity of 58,313 piculs; it is, however, of far less value than cinnamon in the market. The spice has been brought from South China since the earliest dawn of history, and is doubtless the original cinnamon of the Mosaic and other early writings. The scent of the leaves is far more pleasant than that of Ceylon cinnamon."—In 1899 the attempt was made to ship "Wild Cinnamon" from Ceylon, and in his Report for that year Mr. Willis thus refers to this matter:—

"The export tables also show for the first time a heading 'Wild Cinnamon' of which 195,008 lb. bales and 628,418 lb. chips were exported. This consisted largely of the bark of *Litsea Zeylanica*, *Aporosa Lindleyana*, and other trees mixed with real cinnamon. The fraud has now been exposed, and it may be hoped that this will also be the last time this heading will appear in the exports."

But in 1900 again, the export continued though on a greatly reduced scale and the price of "Wild" had fallen so low that it would not pay to collect and ship this product now.

A good deal of cinnamon is imported into the South American States, notably Chili and Peru, for incense and flavouring purposes, although there is a wild cinnamon found in the forests of Peru and British Guiana. The great market for cinnamon is, however, found in Southern Europe, chiefly in Spain and Italy. In all Roman Catholic countries, a good deal is used for incense purposes, while still more is worked up in the manufacture of chocolate, for which Spain is specially famous. We suppose the world's production and consumption of true cultivated cinnamon does not exceed 5 million lb., Java and Malabar supplementing the Ceylon supply. Of cassia perhaps 3 to 4 million lb. more are collected chiefly in China, Siam, Sumatra and the Eastern Archipelago. The consumption in the United Kingdom is very limited; but Spain, France, Austria, Switzerland, S. Germany and Italy use a great deal.

For a practical paper on Cinnamon Cultivation see page 393 of the "Ceylon Directory and Handbook" for 1875; see also, for account of some of the Ceylon Cinnamon Districts in 1883, page 294, vol. II., *Tropical Agriculturist*, as well as references in later volumes; but more especially, our special manual "All About Spices" published at the *Ceylon Observer* press.

CINNAMON PLANTING IN CEYLON:

THE CULTIVATION AND PREPARATION OF CINNAMON:

(Specially written by an experienced Ceylon Cinnamon Planter.)

It was in or about 1765 that cinnamon was first cultivated in Ceylon; previous to that time the supply was obtained from the forest and chenas, chiefly within the territories of the Kandyan King. The grasping character of Dutch traffic, however, involved that people in a chronic state of dispute, if not of absolute warfare with the Kandyan Government, so that it frequently happened that the supply to which those uncompromising monopolists restricted the consumption of the world could not be got, and it was decided that the plant should be cultivated to the necessary extent, within their own territory. It was no doubt after carefully conducted experiments, that the site of the cultivation was selected, and the sandy plains of Maradana, Moratuwa, Kadirana, and Ekala planted in rapid succession, to an aggregate extent of perhaps 15,000 acres; which has ever since been the principal source of supply.

While the Dutch retained possession of the maritime provinces, the law that protected the monopoly were of the most stringent character, and are said to have been executed with determined ferocity. When the English got possession of the Island, the monopoly was retained, but the spirit of trade was not so all-pervading as among their predecessors. The desire of profit did not reign in the minds of the statesmen into whose hands the destinies of the Island fell, to the exclusion of all nobler sentiments and the performance of all higher duties. The monopoly therefore became a minor consideration and the department became the refuge for such members of the Service as displayed no talent for the higher walks of administration. Any man was good enough for a planter—so that what with the restraints of red-tape and the genteel imbeciles employed, the Government after a trial of about forty years, admitted that cultivation was not its forte, and it was decided to sell the gardens,—forests had been the more appropriate name. This decision was put in execution in regard to the out-fields of Moratuwa, Ekala, and Kadirana, and about R10 per acre was realized. In giving up the monopoly, however, Government had no fancy for surrendering any of its profits; an export duty was accordingly imposed, sufficient to recoup all it lost. Long before this the Dutch, braving their own unrepealed law, which awarded death as the penalty of removing seed from the Island, had introduced the cultivation into Java, and with an inferior article successfully competed with the Ceylon spice, having the full amount of the export duty in their favour. The private purchasers had therefore hard enough times. The duty becoming less and less productive year by year, and the proprietors rooting out their cinnamon where the land was fit for coconuts, the tax was at length abandoned and the trade left free, but it had a hard fight of nearly twenty years before Ceylon could finally close up the Dutch shop. Before this happened, however, a flood of cassia was let loose on the market and was said to have in a great measure supplanted cinnamon. Be that as it may, the fact is certain that during the first twenty five years of free cultivation, the proprietors could do little more than make ends meet, and some of them did not succeed even in that. Originally over 5,000 acres were held by Europeans, but many of them sold out in the bad times; others as soon as they mended, and now only about 2,000 acres are held by Europeans, and probably in a few years the whole will be in native hands. The present value is from R250 to R300 per acre. It is only within the last seven years however that they have gone up. In 1861 an estate that could have been purchased for R20,000 in 1873 sold for R95,000; one was purchased for 1867 for R60,000, and sold in 1870 for R170,000. All this was owing to a rise of 50 per cent in the price of cinnamon in the European market, which took place in 1868 and still continues. To European management is due all those improvements, by which the lands have been made to quadruple their produce, acre for acre, since the days of the Government monopoly, and the workmanlike finish that has been given to the prepared spice.

The old lands in Kadirana and Ekala have been under cultivation for a century or more, and though some bushes die whenever there is a protracted drought, and the difficulty of getting up young plants on the old land almost amounts to impossibility, the crops are as large now as they ever were. Improved cultivation has made up for natural decay; and even native proprietors, after European example, keep their estates in a much higher state of cultivation than they ever were kept in till very recently.

Habitat.—Cinnamon is not found growing wild to any great extent in the drier parts of the lowcountry. Whatever may have led the Dutch authorities to choose sandy plains for its cultivation, such lands are certainly not its natural habitat. It is most commonly found as a forest tree at from 1,000 to 2,500 feet above sea-level, and in those angles of the mountain zone that face the monsoons. It is said to have been found growing as high as 5,000 feet,* but it is not common at that height. As the plant has hitherto only been cultivated to any considerable extent on the sandy plains of the Western Province, and has of course acquired the name of yielding the finest spice; the only other land on which it is cultivated being the common cabook gravel of the lowcountry on which it grows more rapidly, but produced a coarser article than on the sand. Whether a fine spice can be produced in a wetter and colder climate by cultivation remains to be tested by experiment. Till this is done we must continue to believe that the best cinnamon is grown on the poorest sand, where there is an average temperature of 83° and an average rainfall of an inch for every degree. This is about the climate of fifty miles of the coast of the Western Province; further south we do not find the sandy plains, and further North we get into too dry a climate, so that a practical monopoly of the finer sorts will probably remain with the Ekala and Kadirana proprietors. Since the prices went up, much cinnamon has been planted in the villages near the coast, but the most of the land is not well suited for the purpose, being merely *owita** or even *deniya*† land, either of which produces an inferior quality, with a great deal of waste wood.

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* We have seen plants at 7,000 feet altitude, the clove odour in the leaves pungent enough, but the bark having scarcely a tinge of the true cinnamon character.—COMPILERS.

Consumption.—This is not an article that enters into the daily habits of the millions of humanity; the present consumption of the world is not one pound to 10,000 inhabitants; the consumption increases not with low prices, nor diminishes with high; it is therefore an article that may be very easily overdone. When some years ago the price went suddenly up 50 per cent., the jungles were ransacked all over the Island, and the exports were nearly trebled; the use made at that time of the jungle article by native proprietors appeared when one of the brokers saw it advisable to publish the only marks that were found genuine, and by implication all that were adulterated. On the one side in this list stood all the properties owned and managed by Europeans; on the other, with hardly an exception, all those owned and managed by Sinhalese; much of the trash by which some scores of Sinhalese dealers that were not previously worth a cent made fortunes, was not saleable at any price, to the heavy loss of the Colombo agents, or their constituents.

Planting-out.—When the cinnamon forests came into private hands, and were cleared, it was found that, exclusive of the low lands called *deniyas*, about one-fourth of the space was vacant; great and persistent efforts have been made to fill those gaps, and many millions of plants have been put out, without in any material degree diminishing their extent. Bundles of from twenty to fifty plants, with a ball of clay six inches cube, put out on the sand, long exposed and thoroughly exhausted, shaded but not watered, die in one month without rain; and in a drought of from six to nine months, even plants four years old and three feet high are snuffed out. It is easy to say "Water," but in those long drought water becomes too precious to be so used. In fact the game is not worth the candle; it will not pay,

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* Highlands only cultivable, so far as rice is concerned, by means of rain.—COMPILERS.

† Low lands, more or less subject to floods, suited to rice cultivation.—COMPILERS.

The usual practice in making *Nurseries* is to form the soil into beds three feet wide ; these are lined six inches apart, and at every six inches along the line half-a-handful of seed is dropped, and covered an inch deep. Over the beds a stage of jungle sticks is erected, to support a shade of kadjans. The beds are watered from time to time in dry weather, and in twelve months the plants are ready to transplant.

The idea of sowing a number of seeds in one spot has probably risen from the difficulty of getting young plants up in the vacancies, and it was supposed that the chances of success were multiplied by multiplying the plants. In planting new land, however, in a climate not subject to such long droughts, there is no occasion to perpetuate this practice. Perhaps the best mode of procedure would be, to prepare the land exactly as for coffee, then line six feet apart, but instead of pegging and holing as for coffee, dig a continuous strip of a foot to eighteen inches wide, along each line, and dibble in one or two seeds at one foot apart along the line. By adopting this plan the plants would probably thrive better than if planted in bundles, and the planter would be enabled to take out the useless kinds, as they asserted themselves, and there would be a supply of plants for thin or vacant parts of the lines, during the first two years. There are several kinds of cinnamon that are next to useless for the purposes of cultivation ; the *korahedi* and the *velli* are the most common of those varieties ; they are more or less to be found on all the estates and on some they amount to a serious evil, tending greatly to the diminution of the crops. The *korahedi* is distinguished by quick growth, but long before the sticks are old enough for peeling, the bark becomes rough and scaly, the cuticle thickens, becomes corky, and splits down to the inner bark or true cinnamon. It is very difficult to deal with, even when it is peelable, and the chaliyas will not cut a stick of it as long as there is anything else to cut. The *velli* grows quicker than any other kind of cinnamon, being often at two years' growth four or five inches in girth, and eight or ten feet in height, but it can very seldom be peeled, and only makes a very coarse spice, or the least valuable kind of chips. It takes its name from sand, because it grits under the teeth, and the bark is often so hard that it will turn the edge of a cattie. As these two kinds of cinnamon are oftener left to go to seed than the good kind, there is great difficulty in getting proper seed, and even when the greatest care is taken, there is much of their seed sown in every nursery ; it would be easy to eradicate them if the plants were put out single, but where a bush is mixed they must be allowed to stand.

Those who planted the cinnamon gardens displayed a lofty contempt for all order and arrangement, for there is not the most remote symptom of lines which very greatly enhances the difficulty of working them ; for now, in cutting, pruning, and weeding alike, every man does very much as he likes, and goes where he will. In *cutting*, there are pieces marked off for each day's cuttings, which it is an offence to go out of; but within the limits, every man ranges as far as he can, that he may get as many as possible of the best sticks. One hundred and fifty men dashing into a ten-acre field agitate it as if a tempest were passing over it, but by the end of a quarter of an hour, all the best sticks are cut and appropriated, and they settle down to steady work, testing every stick before cutting. If the wood is in fair peeling, about two hours is allowed for cutting, or a longer time according to the peeling condition, when they are called off, and it is an offence to cut a stick after the signal of recall. The tops and branches are lopped off and left on the ground, and the sticks collected, dressed, tied in bundles, and carried to the "wadi" or peeling shed.

Peeling is performed with a small-round-pointed knife, having a projecting point on one side for ripping. The peeler sitting down on the ground beside his bundle of sticks, takes one in his left hand, draws a longitudinal slit, from end to end, and works the knife between the bark and the wood till he has raised it about half an inch wide; he then turns the stick and draws another slit paralled to the former and working the knife on that side detaches the slip and so proceeds, rubbing such sticks as do not peel freely with a piece of hard wood. From time to time, as the work proceeds, the slips are packed, the convex side of one to the concave side of another, till about eight or nine inches wide, and about a foot and a half long; these packs are then piled in a small encosure made by sticks driven into the ground, and when the day's work is finished, the heap is covered with scrapings and a mat is bound round it. This is called fermenting by some people, but it hardly amounts to a fermentation. The object is to keep in the moisture and soften the cuticle for the next operation.

Piping.—On the morning of the second day three sticks are driven into the ground at such an angle that they will cross each other about a foot high; they are tied firmly at the point of crossing and used for supporting the end of a fourth stick, the other end of which rests on the ground. The operator sits down on the ground before this fabric, and taking a slip of the bark places it on the stick, and holding the upper end firm with his foot he with a small curved knife having a slightly serrated edge scrapes off the cuticle.

The pipe maker is furnished with a board, about three and a half feet long, a measuring stick and a pair of scissors. He takes a bundle of the prepared slips, and sorts them into the various qualities; he then selects a slip suitable for the outer cover of the pipe, trims it and cuts the ends square with the scissors; then placing it on the board he proceeds to pack within it as many of the smaller pieces as it will close over when dry; this done he pushes it along the board, adds another slip, till he has got the proper length, when he removes the pipe from the board and goes on with another. When the day's work is finished the pipes are arranged on parallel lines stretched across the shed, where they are left till they are firm enough for handling.

Handling is the final finish and consists of pressing in the edges of the outside pieces where necessary, and dressing the ends, after which they are spread on stages in the sun and covered with mats or kadjans, as the direct action of the sun is apt to warp them.* A well-made cinnamon pipe will be of uniform thickness, colour and quality; the edges will be neatly joined in a straight line from end to end; the joints of the various pieces that compose the cover will be close and neat; the ends will resemble a tight roll of paper, and the whole structure will feel firm and compact under the pressure of the finger and thumb. The size of the pipes will be according to the quality of the spice; the finer sorts will run from fifteen to twenty to the pound, and the inferior will range from ten to fifteen; the very coarse is generally stuck together with little regard to appearance.

The peeling seasons are supposed to begin in May and November, but are often later according to the rains; the flush follows the first rains of the season, and continues a longer or shorter time according to the quantity that falls. As the flush or young red leaf assumes the normal dark green, the sap begins to circulate between the wood and the bark, to form a fresh layer of the former: and while this circulation continues, the sticks peel freely, and these are the periods that must be seized for making the crop. It is well if the whole of the crop can be got out in one cutting over, but this is not often the case; if the season is not a good one it may have to be cut over two or even three times, and after all a good deal of the proper age be left. After every cutting one or more young shoots spring from every stump, and as the cuttings take place twice a year, there is consequently a succession of young wood of different ages on the stocks. The bulk of the crop is the wood of two years' growth, but if all the two years' growth is not cut in consequence of a bad season or an insufficient supply of labour, those sticks that promise to peel at next cutting are left, but in the operation of pruning every stick older than two years is cut out, peeling or not peeling; they are collected and carried to a depôt, where they are sorted into peelable and unpeelable: the former are used for making coarse cinnamon, and the latter for chips. The pruning should follow the cutting as early as possible, and consists in cutting out all wood of more than two years old, of reducing all stumps left too high, and removing all weak and crooked shoots and all superfluous branches.

Weeding should immediately follow pruning, and is done by digging a hole with the mamotie, of sufficient size to hold all the leaves, branches and weed for a space of about forty superficial feet more or less, collecting all this rubbish, treading it well down and covering it up; then putting the earth up round the stocks, as it was before, but *never* higher. Earthing up cinnamon stocks was a mistake of the first cultivators, which has entailed much otherwise useless labour on their successors. The roots of the plant run well under the surface, and travel far, but with a mound of earth raised round the stock, and maintained for a long series of years, they are forced against their bias to throw roots into it, and when they have done so the practice may not be discontinued without injury; but anyone planting a new field should avoid perpetuating the error. The error of treating a plant near the stem is not confined to cinnamon, but may be seen in many other cultivations. The truth is that if any plant needs to have the soil it occupies broken up, or if it is to be manured, it is the digging done or the manure applied at the extreme ends of the roots that is most immediately beneficial.

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* This answers the question we put (pp. 23-24) in regard to a statement in one of the quoted articles. What we doubted was exposure to the *direct* rays of the sun.—COMPILERS.

If Sir Samuel Baker had ever seen a hole in which the weeds and leaves are buried turned up at the end of six months, and observed the matting of rootlets that bind it like a turf, he would hardly have ventured to assert that cinnamon did not need manure. He might fairly have said that in practice it got no manure, beyond the refuse of the land it grew on, and such a statement would be nearly as true this day as it was twenty-five years ago, but like most other plants cinnamon grows quicker and stronger where there is plenty of organic matter, than where there is little or none. How a very rich soil or rich manure may affect the quality of the spice has not been proved, but Mr. Gabriel Cross declares that he has doubled the produce by the application of coconut poonac.

There can be no doubt that cinnamon will grow well under cultivation where it is found growing wild: the only question is the quality of the spice, and on those who undertake the cultivation will rest the risk. There is no question about the very low quality of the jungle article; cultivation will improve it, but the extent of improvement remains to be proved. It is just possible that it may take a place beside the old marks, and compete with them in the market, but it seems more probable, that cinnamon so produced will command a much lower position than Kadirana and Ekala. It seems as if nature had granted to a limited region of Ceylon the monopoly of producing this article in perfection; all attemps to cultivate it in other countries have been failures; the Java gardens would never have paid the Dutch E. I. C. for a single year, had it not been for the Ceylon export duty. A French gentleman on the Malabar Coast long carried on the cultivation and preparation—perhaps does so yet—and bestowed the greatest care, but never could get for his produce above one-half of the Ceylon prices; indeed, no cultivation of the plant outside or inside the Island has hitherto shaken the footing of the Alutkuru Korale in the market. The natural end and object in every plant is to produce seed, and where this is the object of the cultivator, he can do no better than cultivate in the chosen habitat of his plant, in the wild state, but cinnamon is not cultivated for its seed, and it is by no means inconsistent with other natural phenomena that the soil and climate that produce a strong seed-bearing tree may not be favourable for the secretion of a subtle essential oil lodged in the inner layer of the bark. This is, however, merely *a priori* reasoning, and except for the purpose of hypothesis has no place in a purely experimental science such as the cultivation of a plant for any particular purpose. The strong point for experimental cultivation within the natural habitat of the cinnaman plant is that such cultivation has never been tried and nothing but trial can decide the point of success or failure.

The cinnamon laurel is just as hardy a plant as the coffee laurel, and the treatment that suits the one will suit the other, in the same climate. The reason why the former is difficult to rear is that the rainfall is less, the heat greater, and the soil less retentive of moisture. Take cinnamon to a climate where the temperature is ten degrees less and the rainfall twenty or thirty inches more, plant it in soil that a fortnight's sun will not denude of moisture to the depth of a foot, and it will require no greater care than any other indigenous plant.*

It has been already said that the sticks are cut at two years' growth, and that the bulk of the crops are obtained from wood of that age. In the low country new land gives a small cutting in the third year, and in a more moist climate the growth will probably be still quicker, and in the third year at all events some crops may be obtained.

Like most other plants cinnamon needs to be kept clean to make the most of it. The system of weeding already described is only applicable on a level surface and soil in which sand so greatly predominates that in the driest weather it remains loose and easily wrought; where those conditions are not, the planter will have to adopt a system suited to the circumstances under which he operates.

The cinnamon plant has few enemies: cattle and goats eat the young shoots while tender; squirrels too destroy some. The principal insect enemy is a minute beetle, that breeds in the leaves, and sometimes does a good deal of injury, by retarding growth, and rendering the wood unhealthy and unpeelable. A red, articulated worm about two inches long cuts its way up the centre of some old and unhealthy sticks, growing on partially decayed roots, but the injury from this insect is hardly worth taking into account.†

Several of the larger proprietors have for some years past strongly competed for the highest prices at the sales; and sometimes one, sometimes another has prevailed. As a higher finish requires time and greater skill, this contention resolves itself into a money matter; if you want finer work you must pay higher for it; accordingly on some estates there is a scale of payments for quality, from 12½ to 50 cents per pound. It is remarkeble, however, that the estates that have always taken the highest average for their whole crops have never adopted this system, but have paid one fixed price for all qualities; it is therefore doubtful whether the bestowing of great labour and skill on a limited portion of the crops pays so well as fair average work at a medium price. The great object of the cinnamon planter is to secure his available crop within a limited time, and if he keeps a number of his best hands making *smarts* at less than one pound per day, while inferior hands make three or four pounds in the same time, at one-third of the price, he would need an ample supply of labour to secure his crops; more ample than most people can command. It has actually happened on a large estate on which this system was followed, that the crops fell off from 800 to 500 bales in a few years, and an awful lot of coarse cinnamon and chips had to be made before the estate could be restored to its old condition; this happened from literal obedience to the instructions of the proprietor, though he in all probability did not calculate that maintaining the honour and glory of his mark would cost him £2,000 or £3,000 per annum.

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* Cinnamon has recently been planted to a considerable extent on the older estates around Kandy,—in Dumbara, Nilambe, &c.—COMPILERS.

† A curious illustration of the fact that the function of the "white ants" is to dispose of dead wood without meddling with living, uninjured tissue is common in the Colombo cinnamon gardens, in the shape of "nests" of the termites built upon around cinnamon bushes, which latter continue to flourish all the same.—COMPILERS.

THE CULTIVATION OF CINNAMON.

(*From the "Journal of the Eastern Archipelago.*")

It appears from experience that the soil of Ceylon is more favourable to the growth of Cinnamon than to that of any other aromatic plant.

A sandy soil is that which is generally selected for cinnamon, but other soils may be chosen also, such as a mixture of sandy with red soil, free from quartz, gravel or rock, also red and dark brown soils. Such land in a flat country is preferable to hilly spots, upon which, however, cinnamon also grows, and even abundantly, such for instance as the hills of Ceylon which are known by the name of the "Kandyan Mountains." The soil that is rocky and stony under the surface is bad, and not adapted for the cultivation of cinnamon, as the trees would neither grow fast, nor yield a remunerative return.

When a tract of land of the above description is selected, the whole of the ground should be cleared, leaving a few trees for shade, to which the labourers might return for rest and relaxation; these may be from 50 to 60 feet apart. The trees felled should be well lopped, burnt and cleared away, the stumps should be removed with the roots, after which they may be allowed to remain, in order to save expense of carriage, merely by observing some degree of order in their disposition, by forming regular rows, of which the intervening spaces are planted with cinnamon. The ground being thus cleared, holes may be dug at 8 to 10 feet apart, and of one foot square; the distance from each plant will depend upon the nature of the soil,—that is, the *poorer* the soil, the nearer to each other should be the trees planted, and *vice versa*.

When this operation is over, should the holes be intended for cinnamon roots, or stumps, the latter must be carefully removed with as much earth as can be carried up with them and placed in the holes, taking care not to return the earth removed originally in digging the holes, which are to be filled with the soil scraped from the surface which has been previously burnt, exposed, and formed into manure. Should no rain have fallen after the placing of the roots in the holes, the stumps should be well covered, and watered morning and evening, until such time as the sprouts shoot out fresh buds, which will be in a fortnight or so from the time they were transplanted, when the watering may be discontinued. In a month, the new shoots will be 3 or 4 inches high,—this depends much upon the weather.

If the holes be intended for young plants or seedlings, the plant must be removed with boles of earth from the nurseries, and placed in the holes, taking the same care as with the stumps, both in watering and covering, in the event of its being dry weather. When the seedlings take root, the coverings should not be removed until the plants throw out a new pair of leaves from the buds, which is a sign of their having taken root.

When a plantation is formed of old stumps all the branches should be cut down within 6 inches from the ground ;—this should be done with one stroke of a sharp instrument, in order to avoid the splitting of the stem. From these stumps cinnamon may be cut and peeled within 18 months from the time of transplanting. Often this is done after the lapse of 12 months from the time of transplanting.

From seedlings one cannot expect to gather a crop before two or three years from the time the plants were transplanted, when there will be but one or a single tree, which when cut down as already shewn, 4 or 6 inches to the ground ought to be covered with fresh earth gathered from the space between the rows, and formed in a heap round the plant. The next crop will be 3 or 4 times as much as the first, from the number of sprouts the stem will throw out, and so on every year, the crop increasing according to the number of sprouts each item will throw out yearly, from the cuttings. In the course of 7 or 8 years the space left between the rows will only admit the peelers and others to go round the bushes, weed, clear and remove cuttings, as the branches from each bush will almost touch each other at their ends.

It is essentially necessary to take every care not to allow any creepers or other weeds to grow : the former interfere with the growth of the bushes by entangling, because it (*sic*) not only takes out so much of the fat feeding the cinnamon trees, but interferes with the peelers during the cutting season and prevents the branches to grow up straight with a free circulation of the air. The plantation ought to be kept clean and free from weeds; the cinnamon requires no manuring, but when the plantation is weeded the bushes should be covered with the surface soil and raising the ground round the bush by making a heap of the earth, which answers well in lieu of manure. This operation must be attended to as soon as the cinnamon sticks be removed for peeling. The plantation requires weeding 3 or 4 times a year during the first 2 or 3 years, then twice a year will answer the purpose—as by that time the trees will form into bushes and destroy the seeds of the weeds on the ground.

The forming of a nursery is necessary, for which a space of ground, say an acre, should be selected in a rich bit of soil, free from stones. Clear the whole of brushwood, only leaving the large trees for shade, remove all stones, stumps and roots, dig the place well 6 or 8 inches deep, then form into long beds of 3 or 4 feet wide, put the seeds down 9 or 12 inches apart, cover them 8 or 12 inches above the ground by a platform, and water them every other day until the seeds grow up and give one pair of leaves; then leave off watering (unless very dry weather—then it ought to be continued), but not uncover until the plants grow up 6 or 8 inches high, and can bear the sun, and these seedlings will be ready for transplanting after three months from the time they were sown.

The forming of nurseries is done at the close of the year before December. When this be done first, the party commences clearing and preparing the land during the dry season, which is from the beginning of December up to end of March following. April will set in with heavy rain (it is generally so in Ceylon) and will continue wet weather till the end of August, and very often till September and October, and have the benefit of 4 or 5 months' rain.

The cinnamon seeds are to be gathered when they are fully ripe; they must be heaped up in a shady place, to have the outside red pulp rotted; when it turns quite black, then have the seeds trampled or otherwise freed from the decomposed pulp, uninjuring the seeds, and have them well washed in water (just as is done to cherry coffee, before they are made into parchment in the white shell), and have the seeds* well dried in the air without exposing them to the sun, and then put them in the ground prepared for their reception. In washing the seeds those that float on the surface should be rejected.

There are five different sorts of cinnamon, viz:—

1st is called Panni Miris Kurundu.
2nd " Tittha "
3rd " Kahatte " "
4th " Walli " "
5th " Savel " "

Of these, the first kind is the best of all, the 2nd and 3rd although inferior are peeled likewise, the 4th and 5th are spurious.

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* If cinnamon seeds after washing be exposed to the sun, even for twenty minutes, the shells will crack into two and destroy the seeds from growing.

The distinction in the cinnamon can be known both by taste and the shape of the leaves on the tree, and an experienced "Chaliya" man will judge the quality of cinnamon by first sight.

The quality of the bark depends upon its situation in the branch; that peeled from the middle of the bush or branch being the *most superior* or 1st sort; that taken from the upper end is the 2nd quality; while the bark removed from the base of the branch, or the thickest end, is the most inferior and called the 3rd sort.

From the cinnamon bark refused in the sorting store of all kinds, in separating the first, second and third qualities, and in making up into bales for exportation, the refuse is collected, and by a chemical process, cinnamon oil is extracted, which sells very high, with an export duty of 3s or 1½ rupee on each ounce, exclusive of the British duties payable in England for importation, which is at present one shilling and threepence for ounce.[*]

From the cinnamon leaves, a kind of liquid is extracted in the same manner, which goes by the name of "clove oil," and is sold for a little less than cinnamon oil,[†] with a duty, I believe, as on cinnamon oil.

Of the cinnamon roots camphor is made, and sells well both in Ceylon and other parts of the world by exportation.[‡]

LAURUS CINNAMOMUM.

BELONGING TO A GENUS OF THE CLASS AND ORDER EUCAUDRIA MONOGYNIA.

The roots of the Cinnamon tree are branchy and ligneous; the bark of these roots has the pungent smell of camphor, with the delicious odour of cinnamon, and yields camphor, by distillation. The wood of the tree is light, fibrous and inodorous. The trunk is from 12 to 18 inches in diameter, rising to the height of from 20 to 30 feet; it grows irregular and knotty; the external bark is thick, rough and scabrous, and of an ash colour, the inner bark is reddish. The bark of the young shoots is often speckled with dark green and light orange colours. The branches are thick and spreading, and shoot forth horizontally or inclining downwards; they are covered with numerous oblong leaves growing in pairs opposite to each other; when first developed these leaves are of a bright red hue, then of a pale yellow, and, when arrived at maturity, of a dark olive colour. At full growth they are from 6 to 9 inches long and from 2 to 3 inches broad. The upper surface is smooth and shining and of a darker green than the underside. The petiole has the odour and taste of cinnamon.

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[*] No export duties exist in the Straits Settlements.—ED. [Nor in Ceylon.—COMPILERS.]

[†] At a vastly lower price.—COMPILERS.

[‡] We doubt if the camphor obtained from cinnamon roots was ever exported except as a curiosity. Even in Ceylon we have never heard of it being used, except in the form of candles at grand native marriages.—COMPILERS.

The plant blooms in January and February and the seeds ripen in June, July and August; many white flowers grow on one peduncle; they have no calyx. Their smell is, though not strong, exceedingly pleasant, resembling a mixture of the rose and lilac. The fruit is an oval berry larger than a black currant, and adheres in the manner of an acorn to the receptacle which is thick, green and hexangular. The leaves when full-grown emit a strong aromatic odour on being bruised and have the pungent taste of cloves.

Crows and wood pigeons devour the berries with great avidity; in passing through them, the productive qualities of the seed remain unimpaired, and by this means the plant is disseminated over a great extent of country, it being found even in the thickest and most impassable jungles. Cattle of all descriptions eagerly feed upon its foliage; when the berries are first gathered, their taste resembles that of the juniper berry; they soon become dry and then assume the form of a small kernel contained in a thin shell. If boiled they yield an unctuous substance which when cold becomes solid like wax. It emits an agreeable odour, and may be formed into candles, which formerly were reserved for the exclusive use of the Kandyan Court.

The prepared bark of this tree is the cinnamon of commerce. Diversities in the quality of cinnamon do not appear to arise from any varieties of the plant, but from care and skill in the preparation, the soil and exposure of the country, the age and health of the plant. It is rarely found worth collecting except on the southern and western aspects of the island. Beyond certain limits the bark is never of a good quality, as it is powerfully affected by local circumstances. The *Karuwa* of the Malabar Coast has been considered by many botanists as indentical with the *Laurus Cassia*, but it is said that specific difference can be discovered between the cinnamon tree of Ceylon and the *Karuwa*. The prepared bark of the *Karuwa* is according to good authority inferior to the best Ceylon cinnamon. It is, however, allowed to be superior to the produce of the cinnamon tree which is found on the northern and eastern part of the island. Linnœus deceived by the name of *Laurus Cassia* was misled, and ascribes qualities to that tree which it does not possess. The cassia bud of commerce is not the produce of the *Laurus Cassia*, but it is the fleshy hexangular receptacle of the seed of the *Laurus Cinnamomum*. When gathered young, the receptacles completely envelope the embryo seed, which progressively protrudes, but continues firmly embraced by the receptacle. The buds are of various sizes, having the appearance of nails with roundish heads. If carefully dried the receptacle is nearly black. These buds are not prepared in Ceylon.

The cinnamon plant delights in a *silicious soil* with an admixture of vegetable mould, in which only it produces the sweet taste, aromatic smell, and the pale brown or russet colour which renders it so valuable as an article of commerce, and useful as a spice; for it has generally happened that plants even of the genuine kind, when grown in valleys on marshy ground or those subject to inundations, lose their characteristic properties; the plants growing in Batticaloa and Chilaw, which are allowed to be of the genuine kind, are deficient in smell and taste and are consequently less useful or valuable; and the cinnamon grown in the valleys of Moronca [Morawak Korale.—COMPILERS.], the soil of which is marly, yields a bark of inferior quality. Again the plants which were raised in Bombay, from seeds and seedings sent thither at an early period of the British rule in this island, although they grew luxuriantly, produced bark of an inferior quality which was not valued as an article of commerce.

Besides the inferiority in smell, taste and colour, which invariably mark plants grown in any other than a silicious soil, a disadvantage of no little importance to the grower has been observed to follow. Whilst the stumps of plants grown in silicious soil shoot forth rapidly and are fit to be peeled a second time, within a period of but four or five years, and produce bark superior in quality to that peeled at first, those grown on a hilly or marshy soil require a time of not less than six years before they can undergo a second peeling, and yield bark less in quantity and inferior in quality to that peeled at first.

When the ground is prepared in planting cinnamon, the low brushwood and young trees are cut down, but lofty trees are allowed to remain at intervals, as it is, found that the tender plants thrive better under their shade than when exposed to the direct rays of the sun. The planting usually takes place when the seeds are ripe. For this purpose a line is stretched across the ground, and guided by it the planter turns up about a foot square of ground at intervals of six or seven feet. The brushwood and branches having been previously burnt, their ashes are then spread upon the newly dug spots, and into each of them four or five cinnamon berries are sown in holes made with a dibble; they are then covered with earth, and branches of trees are laid over the parts to prevent the earth from becoming parched, and to protect the young shoots so soon as they come forth. This takes place in about 15 or 20 days; sometimes the berries are sown in nurseries and the young plants are transplanted in the month of October and November. In favourable situations, shoots attain the height of five or six feet in about six or seven years, and a healthy bush will then afford two or three shoots for peeling. In a good soil every second year from four to seven shoots may be cut from one tree; thriving shoots of four years' growth are sometimes fit for cutting. As four or five seeds are usually sown in one spot and in most seasons the greater part germinate, the plants grow in clusters "not unlike a hazel bush." If the season be usually dry, many of the seeds fail, while the want of moisture is often fatal to the young shoots, so that it is sometimes necessary to plant a piece of ground several times successively. A plantation of cinnamon, even on good ground, cannot be expected to make much return until after the lapse of eight or nine years. [In Ceylon we suppose 4 or 5 years.—COMPILERS.]

This plant is likewise sometimes propagated from shoots, cut from large trees or by layers, or lastly by transplanting large stumps. The method of culture by seeds is considered the least advantageous, and the trees are longer before they arrive at perfection. If cultivated from shoots the sprouts must be continually watered, or they will not thrive. These selected for the purpose should be very young, not having more than three leaves, if older they die.

The third method by layers is recommended by Dr. Wright [? Wight.—COMPILERS.], since the numerous side branches which issue from the bottom of the trunk always furnish a plentiful supply well adapted for laying.

The transplanting of the old roots is a plan of modern adoption, and the practice is much approved, since they yield shoots of the usual size twelve months after they have been placed in the ground. Great care is, however, necessary in their removal, for should any of the rootlets, even of one-tenth of an inch diameter, receive injury, the whole root will certainly perish. Thunberg mentions a fifth method of cultivation, or rather a manner of obtaining cinnamon of superior quality. When the tree is cut down and a fire kindled on the spot to consume the stumps, the roots afterwards throw out a number of long straight shoots which yield incomparably fine cinnamon. From these are cut the cinnamon walking sticks, which in appearance resemble those of the hazel tree, and retain the taste and smell of cinnamon. They have no scent, however, unless when the bark is rubbed.

The peeling process commences early in May and continues until late in October. When a *Chaliya* perceives a shoot of a proper growth, he strikes an instrument which recembles a small bill-hook obliquely into the shoot. He then gently opens the gash to discover whether the bark separates freely from the wood; should this not be the case, he leaves the sucker for a future time; some shoots, never arrive at a fit state for decortication. Plants of several years' growth sometimes bear numerous marks of annual experiments made for the purpose of ascertaining whether the bark were in a favourable situation for being removed.

The shoots which are cut are usually from a half to three-quarters of an inch in diameter, and from 3 to five feet long. Some travellers in former times asserted that the cinnamon was peeled from the tree while standing, and that nature provided the decorticated plant with a new bark. It is said that the experiment has been recently tried on several plants, all of which died in consequence.

The shoots being cut are tied in bundles and carried to sheds appropriated to the preparation of the cinnamon.

Being cleared of small shoots and leaves, two longitudinal slits are made in the bark which is gradually loosened with the convex side of the knife, and then usually, half the circumference of the bark comes off in one entire slip. When the bark adheres firmly to the wood, it is strongly rubbed with the handle of the peeling knife until it is disengaged and stripped off. The sections of the bark thus obtained are carefully put one into the other, the outer side of one piece being placed in contact with the inner side of another, they are then collected into bundles and firmly pressed or bound together.

In this state the bark is allowed to remain for twenty-four hours or sometimes for a longer period, by which means a degree of fermentation is induced that facilitates the subsequent operation of removing the cuticle. After being subjected to this treatment the interior side of each section of bark is placed on a convex piece of wood, and the epidermis, together with the greenish pulpy matter immediately under it, is carefully scraped off with a curved knife. This is an operation requiring some nicety, for if any of the outer bark be allowed to remain, it gives an unpleasant bitterness to the cinnamon. In a few hours after the removal of the cuticle, the pieces are put one into the other, the bark dries, contracts, and gradually acquires the appearance of a quill or pipe, the whole forming a congeries of quills more than a foot in length. During the first day the cinnamon is suspended under the shelter upon open platforms, and on the second day it is placed on wickerwork shelves and exposed to the sun.[*] When sufficiently dry it is made up into bundles of about thirty pounds weight each, and these are deposited monthly in the Government Magazine of Colombo, where previous to preparing them for shipment, they undergo an examination by experienced native sorters under the superintendence of an European appointed for the purpose.[†]

The bark of large shoots or thick branches of trees produces coarse cinnamon; occasionally the external pellicle of this sort is scraped off, which thins the cinnamon and improves its colour. It is, however, even then thicker and of a darker colour than that of a good quality, while it is of a very inferior flavour and is disagreebly pungent. This sort is always rejected by the inspectors as unfit to be exported to Europe. The bark of very young and succulent shoots is likewise of an inferior quality, and is not admitted among the Company's[‡] bales. It is very thin and of a light straw colour, of very little flavour and that evanescent; shoots exposed during growth to the direct rays of the sun have their bark more acrid and spicy than the bark of those which grow under a shade. A marshy soil rarely produces good cinnamon, its texture under this circumstance being coarse grained and spongy, while it possesses very little aroma.

It is hardly possible to discover the cause which produces the varieties in the quality of the bark, since branches from the same trees are found to yield cinnamon of very different qualities.

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[*] Is cinnamon bark now ever thus exposed to the sun?—COMPILERS.

[†] Cinnamon is now, except in the case of "chips," invariably made up in bales of 100 lb., carefully covered with gunny cloth.—COMPILERS.

[‡] This article was of course written while the East India Company and the Ceylon Government Cinnamon Establishment existed.—COMPILERS.

The best Ceylon cinnamon is thin, smooth, and shining, and of a light yellow colour; it admits of a considerable degree of pressure and bends before it breaks, the fracture is thin and splintery. It has an agreeable warm aromatic flavour with a slight degree of sweetness.

When masticated, the pieces become soft, and seem to melt in the mouth.

From cinnamon which has been rejected for shipment, oil is usually extracted; best oil of cinnamon sinks in water, but when inferior it is of smaller specific gravity. A very large quantity of bark is required for obtaining only a small portion of oil; it is reckoned that 80 lb. of newly-prepared cinnamon yield about 5½ oz. of heavy oil and 2½ oz. of light oil. Cinnamon is packed in bales for exportation being bound with ropes, and then put into double gunnies. It is the usual custom to send black pepper among the bales; this practice originated with the thrifty Dutch, since by filling up the interstices between the circular packages with peppercorns, tonnage was economized. If there were no pepper, coffee was substituted. Thunberg attributes peculiarly excellent effects to this method of packing with pepper.

E. BODDAM,

—*Mysore Gazette.* *On Special Duty.*

A TRIP THROUGH SOME OF THE CINNAMON (AND COCONUT) DISTRICTS, CEYLON.

Having had occasion during this month to pass through some of our favourite cinnamon districts on business, I lay a few notes of my observations before your readers. First in order of merit, though not in the order of my visit, comes Goluapokuna, the premier cinnamon estate. The extent of this magnificent property is 1,100 acres, about a half of which is under coconut, not planted in the usual style amongst the cinnamon, but in separate fields alternating with cinnamon. This estate is superintended by Mr. Raoul Piachaud, the oldest and most experienced Cinnamon Planter in the island, whom I was very glad to meet after a long interval, and who is looking as buoyant and youthful as ever. As assistants he has Messrs. Nicholas and Campbell, the former a son of the Rev. Nicholas, and the latter a son of the late Mr. A. Campbell of the P. W. D. The estate is in two divisons, each division being under the supervision of an assistant, and as the working accounts and produce of each division are separate, and the cinnamon is separately shipped, a spirit of healthy rivalry is fostered between the assistants to work economically, and turn out the best samples of cinnamon. The quilling of cinnamon here has gone as near perfection as possible; the average number of quills to a pound of all the qualities reaches about 35, while minus the 4th quality the number averages about 45 to a pound, Your readers, who do not deal in cinnamon, can form some idea of the fineness of the quills by being told that the cinnamon sold to the Fort houses averages from 15 to 20 quills to the pound! Everything may be overdone, as I believe this is, for quality is undoubtedly sacrificed to quality. Work like that I have indicated takes a deal of time to do, so unless the estate can command an unlimited number of peelers, all the crop cannot be taken in during the season, and the peelable sticks become coarse. I suppose Mr. Smith, the rich and fortunate possessor of this splendid estate, does not mind this, as long as his cinnamon tops the market. By the way, it is right to mention that the rate of payment to peelers on this property, as on Mr. Rajapakse's too, I believe, is higher, and very naturally, than on the generality of estates. While other estates pay 16 cents for the quilling of the first three qualities of cinnamon, and 12 cents for the 4th quality, this estate pays 21 cents for what is termed superior cinnamon, 19 for the first three qualities, and 12 cents for the 4th quality. As the 4th quality of cinnamon on this estate is about the thickness only of what is known as 1st in the Fort houses, I conclude that the coarser sticks are scraped, and the outturn of chips is very high.

The coconut topes belonging to this estate are very highly cultivated. They are ploughed at intervals, and the trees manured with bones, castor cake and cattle manure. The questions that naturally arises in one's mind is, why should coconut trees be manured with castor cake when coconut poonac, a product of the tree, is available? I cannot answer the question, for I have nothing to do with the management of the estate. If, like the Horrekelly estate and the estates of Messrs. Gabriel Croos and Akbar, machinery were erected for pressing and combing fibre, heaps of available manure could be had in the resulting poonac and coir dust. And if the hundreds of acres of swamp which intersects the estate be used for Paddy cultivation, hundreds of cattle could be stall-fed under the very coconut trees, with poonac and paddy straw, so that not a particle of valuable dung or urine would be wasted. They will be applied direct to the trees, saving the cost of application, all that is needed being ploughing to thoroughly mix the manure. The Decauville Railway, which can be easily laid down and worked, and as easily taken up on this flat estate would be very useful to transport crop, cattle-food, &c. That a go-ahead coffee planter, with new products on the brain, has something to do with this estate, becomes evident after seeing the attempts made to grow the various kinds of Rubber, Cacao, Liberian coffee, &c. No part of this estate is suitable for the growth of any of the products I have named, as most of the estate is sandy, and the bungalow is situated on a cabook hill, through the soil of which hardly anything but the roots of large trees could penetrate. As Ceara Rubber is said to grow *anywhere*, perhaps the sandy soil, if it does not exactly suit it, will permit of its growing. The Visiting Agent of this estate evidently believed, without reservation, the wonderful growing powers attributed to Ceara Rubber when it was introduced, for I see a water-logged swamp, more fit to grow the Sago palm than Ceara Rubber, planted with this product. All I can say of the plants are that they are growing. Perhaps the Agent will triumphantly say that, after all he is not as gullible as he seems to be; but the plants are as yellow-stunted and sickly-looking as plants could well be. You may remember that Mr. Borron put some cuttings of Ceara, in a bare rock and heaped pieces of rock in them, to see whether they would grow if pressure were on them. Being disgusted that the cuttings did not grow, he communicated his disappointment to the *Observer*. As I have to notice the appearance of a few other estates before reaching Negombo, I had better proceed.

Kimbulapitiya, which adjoins Goluapokuna, is another fine property. The old and venerable part-proprietor of this estate, Mr. Young, lately came by his death under very painful circumstances in Kandy. With that plucky spirit which is the birthright of the Britishers, he indulged in a form of exercise which hardly became his years. Though repeatedly warned by his friends, he persisted in riding a spirited horse, till he was thrown down and died. This property is under the supervision of Mr. Carry, a son of the late superintendent, another old planter who died recently. It does not appear to be so carefully worked as its neighbour. If the Superintendent took a leaf out of the book of experience of his neighbours, and went in for high shade for his cinnamon, by topping off the low, overhanging branches of the large trees, it would add greatly to the appearance of the estate, and to the growth of the cinnamon under them. On looking over these old cinnamon estates, one is struck with the utter absence of roads on them, and wonders how efficient supervision is compatible with this want. This estate is said to possess a splendid field of coconut-palms, the nuts of which are said to be superior in thickness of kernel to those of even highly-cultivated Goluapokuna.

Between Kimbulapitiya and Mr. John Carl Fernando's estate lie a few small pieces of low-lying cinnamon land belonging to natives. The carefully trimmed and impregnable (to cattle) cadju fence on Mr. Fernando's estate, arrests attention. This style of fence is as cheap and effective as one could wish to have, and withal it is pretty. Cadju nuts are planted along the line of fence about a foot apart; when about a cubit high, the plants are bent down and twisted one with another. Shoots are thrown out by these, which in turn receive the same treatment, till you get up your fence to the required height, when all that is done is to trim the fence. Through this fence no animal larger than a hare can creep. I suppose this fence grows best on sandy soil, as I have planted the nuts on soil which is not sandy, and two years' growth hardly reaches a cubit. This estate has cinnamon and coconuts growing together, a mistake on poor sandy soil, and the look of the coconut trees suggests that thorough draining has been too long delayed. Perhaps better management than a conductor's, although more expensive, would have assured better cultivation. The few other large properties passed before Negombo is reached, also suggest that sufficient importance is not attached to thorough-drainage in low-lying and swampy situations. Negombo is at last reached. The appearance of the highly ornamental street lamps is striking. They supply a great want on dark nights. The town is clean, and trade appears to be brisk.

From Negombo I must "hark back" to Heneratgoda, as the journey I undertook was from that station to Mahara inland, *via* Ekele. The first cinnamon estate met with is Gállá, at one time a crack estate. It has passed through strange vicissitudes. It was at an early period in charge of that veteran cinnamon planter, Fredrick Schrader. It is generally believed that Messrs. Stevenson and Lawrence made their money by this estate, having bought it at a low figure, and sold it after a few years' residence on it to Denis Aratchi, till then a conductor on an adjoining estate belonging to the Messrs. Armitage, for somewhere about £14,000. It was when managing this estate that Mr. Stevenson first tried the English market with chips. His effort met with success, and the high prices for cinnamon then ruling so stimulated this new industry and gave it so firm a footing, that growers, in spite of plain figures being placed before them, and the opinion of grocers and respectable agents in England, still cling to the trade in chips with a blind tenacity. Owing, it is said, to this estate being purchased with borrowed capital, the recent low price of cinnamon, and the prodigality of a member of the old man's family, the condition of this place has been going from bad to worse, till one sees acres and acres of once fine cinnamon quite snuffed out. What remains is quite stunted in growth, the result of long-continued neglect. Some agreement was lately entered into by which the creditor or his agent either took over the property or advanced money for its working; but up to date no appreciable difference in the state of the estate is to be seen.

Next in order comes the estate once belonging to Arbuthnot & Co., and till lately superintended by Mr. Raoul Piachaud of Goluapokuna. When this estate was for sale seven or eight years ago, offers, it is said, were made for it reaching up to £16,000. The agents were willing to close at this figure, when Mr. Piachaud wrote valuing the place at £18,000. Offers rose till Messrs. Loos, Staples and Wijeyasekere took over the property at that figure. This was during the time of high prices—when there were instances of gambling in cinnamon lands. Before, it is said, the money was paid down, the present owners offered £21,000, and so became the purchasers of this fine property. So that the other three each received £1,000 simply for their pluck in offering £13,000 for it. This estate does not seem to be quite so energetically worked now as before, probably owing to continued low prices for cinnamon.

Still another instance of high price for cinnamon land. A choice [illegible]00-acre block of the first noticed Gâllâ estate was bought 5 or 6 years ago at the rate of R850 the acre. This fine compact property and the

Ekele estate, which belonged to the late Mrs. Drieberg, are perhaps the most carefully-worked cinnamon estates in the Island. The Planter-Proprietor is a firm and consistent believer in high cultivation, and, notwithstanding depressed times, these properties are as clean as a well-kept garden and attract the attention of every passer-by. You may remember having taken over lately from the *Observer* a para written by a man from the hills, who had gone to the Jaela resthouse for a change, and who in his walks passing these properties was struck with their order, as regards weeding and pruning. His experience is the experience of every passer-by. Mr. Drieberg received his first training as planter on a coffee estate of the Messrs. Rudd, under Mr. Forbes Laurie. On his mother purchasing Ekele estate from the estate of the late Mrs. Raymond, he went up to serve his apprenticeship under Mr. Piachaud. As after results shew, the training he got was useful. The cinnamon of these estates, as can be seen by the published price lists, comes third in order, Goluapokuna and Mr. Rajapakse's cinnamon being first and second; but, as I said in my last, they obtain a special-quantity of cinnamon by paying special prices. While there I saw the cinnamon Mr. Drieberg was preparing for the Show, and I think he can safely challenge the world to beat the samples, seeing that the cinnamon cultivation is confined almost exclusively to our tight little Island. Although he did not get the Gold Medal at the Exhibition, he fully deserved it, and he has the satisfaction of knowing that the syampathies of the public are entirely with him. While on this subject I think it not fair to Exhibitors that those sending exhibits should sit in judgment on what they send. Perhaps you may be aware that Mr. Drieberg was the Gold Medalist at the previous Show, and was awarded the Gold Medal at the Melbourne Exhibition together with Mr. Rajapakse.

While at Mr. Drieberg's bungalow, an old peeler with recollections of the Dutch period dropped in. He recounted his experience as a peeler under the Dutch rule. There were no regular gardens then, and cinnamon grew in the jungles. A census of the peeler population was kept, and every head of a family was ordered to deliver at the Government stores a certain quantity of cinnamon annually, the cinnamon to be cut from wherever it was growing on Government or on private lands. At the appointed time the village Headman was to accompany the peelers with their cinnamon to Colombo, when each man's cinnamon was weighed and taken over. The poor unfortunates who, from idleness or any other cause, delivered a quantity less than that ordered, were publicly whipped at Galle Face, ladies being assembled at the "upstair house" to witness the whipping.

The Dutch knew the requirements of the outside market, and all the cinnamon they had in store beyond requirements was burnt. (A lesson for cinnamon growers of the present day on scraping chips.) It is not to be supposed, the old man said, that this compulsory labour was done gratuitously. Each of the registered families received a bushel of rice, a measure of salt, and 7s. 6d. monthly. With a chuckle and an attempt at a twinkle of his now sightless eyes, the old man related how they, the peelers, made capital of their calling. Enjoying as it did the monopoly in cinnamon, the Government watched all bushes wherever growing with a jealous care, and promptly and severely punished all those guilty of destroying a cinnamon bush, even those on private lands. Whenever a man felled a piece of jungle to cultivate it, a peeler would on the sly scatter a few branches of cinnamon on the land, and go to his hut and charge the goiya with wilfully destroying a cinnamon bush, and as proof point out to him the branches scattered on his newly-opened land. To purchase silence, and save himself punishment, the frightened land-owner would give the man a bribe of rice, coconuts, &c. So that the peeler in those days must have been a privileged individual. This old man with commendable foresight has provided for his funeral, which cannot be very far off, considering his great age, by having a coffin built for himself. He has also given the customary *dhana* or almsgiving for the repose of his soul. So that now all he has to do is to die.

Leaving Ekele, I drove along the Colombo road to the Mahara Station. This fine road, always admired for its evenness, is now in a most wretched state, and is a succession of ruts along both the wheel tracks. Travelling as I did in a hackery, it was far from comfortable. Just as one wheel got out of a rut the other entered into one, giving the hackery something of the motion of a pulper sieve. As a result, however forward I might be sitting, a few jerks brought me to the back of the hackery, and just as I was about to be pitched out. I gathered myself and moved forward, only to go through the same movements again. As this pitching-out process was going on incessantly, you may gather I was pretty well shaken before the turn to Mahara was reached. It served me one good turn. It made my liver, which was getting torpid, act; but the remedy was worse than the disorder.

Between Jaela and the Mahara turn a good few cinnamon estates are passed. First in order comes Mr. De Breard's a fine compact little property, which will not suffer in appearance or in the working, if visited oftener: but it is said to abound in snakes. Bolawatte, a fine property, looked peculiar, as travellers along the road were able to "overlook" the property, owing to the short growth of the cinnamon. There is a wonderful change in the appearance of the place now—it seems to be growing. Kapuwatte is an estate in which cinnamon and coconuts are grown together. The unsuitability of the land to grow the products together is clearly indicated by the sickly yellow colour of the coconut branches. The local agent of the former owner of this property is said to have given it to the present proprietors at a figure lower than others offered for it. The great harm done to valuable properties in the hands of greedy lessees, is shewn in the weedy state of this place. Welisara estate too looks neglected. Mahara being reached and my notes ended, I must say good-bye.—*Cor.*, "Ceylon Examiner."

CINNAMON.

(*From "Spon's Encyclopædia."*)

CANELLA, OR CANNELLA ALBA.—(FR., *Canelle blanche;* GER., *Canella*)—*Canella alva* has aromatic stimulant properties. The tree grows to a height of 20, 30 or even 50 ft., in the Bahamas, several of the W. Indies (Barbados. Cuba, Guadaloupe, Jamaica, Martinique, St. Croix, Trinidad), and in S. Florida. The bark is collected by subjecting it first to a gentle beating, to remove the suberous layer, and an additional one to effect a further separation; it is then peeled off, and dried, ready for export. It is now shipped solely from the Bahamas (Nassau, New Providence I.), where it is called "Whitewood bark," or "Cinnamon-bark"; the exports, in 1876 were 125 cwt; the market price is about 24, 30s. a cwt. The drug reaches us in the form of quills, 2–8 in. long, ½—2 in. wide. It has a bitter, pungent, acrid flavour, and an agreeable cinnamon-like odour, which it retains for centuries; even its corky coat is fragrant. Its medicinal use in Europe is decaying; as a condiment, it is used by the W. Indian negroes. It is often confounded with Winter's-bark. The powder mixed with aloes forms the Hiera Picra of the druggists' shops.

CINNAMON AND CASSIA-OILS.—An essential oil, erroneously called "white cinnamon," is obtained by the aqueous distillation of the bark of *Canella alba*; it is a mixture of caryophyllic (eugenic) acid, an oil resembling cajuput, and an oxygenized oil. It is not a commercial article.

Essential oil of considerable importance are derived from the true cinnamon of Ceylon, *Cinnamomum zeylanicum.* Foremost is that yielded by the bark, to the extent of ½-1 per cent., which is extensively distilled (aqueous) in Ceylon, and rarely in England. It is a golden-yellow liquid with powerful cinnamon odour, sweet and aromatic, but burning flavour, and sp. gr. 1·035. It is largely used in perfumery. Ceylon ships some 15,000-40,000 oz. annually of this oil, chiefly to England. A century ago, the average yearly sales by the Dutch E. India Co. were but 176 oz. The leaves afford a brown, viscid, essential oil, of clove-like odour, sp. gr. 1·053, sometimes exported from Ceylon; and a third oil is supplied by the root,—a yellow liquid, lighter than water, with an odour of camphor and cinnamon, and a strong camphoraceous flavour.

Various species of *Cinnamomum* occurring in Tropical Asia afford the so-called "cassia-bark." From this bark, is distilled, notably in China, an essential oil agreeing chemically with that of Ceylon cinnamon bark, but of less agreeable odour, and sp. gr. 1·066. The yield by distillation is about ¾ lb. of oil from 1 cwt. of bark. The oil is an export of no small importance from some Chinese ports. Pakhoi shipped 66,650 lb. in 1877, and 200 *piculs* (of 133⅓ lb.) in 1879; Macao exported about 480 *piculs* in 1879. A large proportion comes to Great Britain, but Hamburg seems to be the most important destination. The oil is used for perfuming soaps.

CASSIA (FR., *Casse*; GER., *Cassia*).—**The bulk of the spice known as cassia**, or "Chinese cinnamon" as it is frequently called on the Continent, is produced by an undescribed tree of S. China, chiefly growing in Loting and Luchpo (in Kwangtung province), Taiwao (in Kwangsi), and in Kweichow, and found in about 19° N. lat. in the forests of the Le Ngum valley, on the left bank of the Mekong, near the Annam frontier. The tree is generally referred to as *Cinnamomum* [*Cassia*] *aromaticum*. It is said to grow with little attention in situations unsuited to other crops. The bark of the tree, forming "cassia lignea," occurs in small bundles about 1 ft. long and 1 lb. in weight, bound up with split bamboo. It has been stripped off the tree by running a knife along each side of the branch, and gradually loosening it: it is then allowed to lie for 24 hours, undergoing a sort of fermentation which pemits the epidermis to be easily scraped off, the bark soon drying into the form in which it appears in the market. The quills bear a close resemblance to cinnamon, but are less uniform and less carefully prepared. They are thicker and harder than cinnamon, and rarely consist of more than two quills, one rolled in the other. There is no doubt that the powdered bark is very largely substituted for the higher priced cinnamon, discrimination between them being a matter of some difficulty. The most reliable tests yet made known for their distinction are given by Hehnur, in a paper read before the Society of Public Analysts, Nov, 19, 1879, the main deductions from his observations being:—(1) The proportion of ash in cinnamon is pretty constant (4·59–4·78 per cent), cassia lignea giving much less (1·84), and cassia vera nearly the same as cinnamon (say 4·08): (2) the amount of ash soluble in water is 2504–28·98 per cent in whole cinnamon, about 18 in chips, 8-15 in cassia vera, and 26-40 in cassia lignea; (3) the proportion of oxide of manganese is never more than 1 per cent (0·13–0·97) in cinnamon, but over 1 (1·13–1·53) in cassia vera, and 365-5·11 in cassia lignea: (4) the cinnamon ash is always white or nearly so, while both the cassia ashes are grey or brown, and yield abundance of chlorine on heating with hydrochloric acid. The young branches of the tree affording cassia lignea are collected and tied up in fagots, constituting cassia twigs, which are a large article of local commerce. The immature fruits of the same tree are believed to form the cassia buds of English trade. Cassia vera or wild cassia is an inferior kind of cassia lignea. The approximate London market values of the spice are:—Lignea 36-60s. a cwt.; vera, 22-46*s*; buds, 49-72*s*.

According to Low, the *kulit lawang* of Borneo is the aromatic bark of a wild species of "cinnamon," and is produced in abundance in all parts of the island. It much resembles the true cinnamon of Ceylon. A recent writer on the Indian Archipelago (Moore) states that "cinnamon" is the most costly product of Cochin China, and is an uncultivated article. It has a very pungent taste, and is for more aromatic than that of Ceylon. There are several qualities of it, some of which bear a most exorbitant price, and are solely appropriated for the royal use. The outer rind is never removed from it, and it is consequently much thicker than Ceylon. It is in high demand among the Chinese, who export large quantities, and prefer it to the best cinnamon of Ceylon. Possibly it is this particular kind which is meant in the Consular Returns for Shanghai for 1879, where an export of 50½ *piculs* (of 133⅓ lb.) of "cinnamon" is stated, in addition to the figures relating to cassia. Handbury and Flückiger doubtfully refer this thick "cinnamon," or more properly cassia, to *C. Cassia* and *C. Burmanni* var, *a. chinense*.

CINNAMON (FR., *Cannele de Ceylon;* GER., *Zimmt. Ceylon Zimmt, Kaneel.*)—True cinnamon with which cassia is confounded, is produced by *Cinnamomum zeylanicum*, a small evergreen tree of many varieties, distributed through the forests of Ceylon up to 3,000 and even 8,000 ft. The quality of the bark varies exceedingly with local conditions, some being so inferior as to be collected only for purposes of adulteration. The culture of the best kind seems to be restricted to a strip of country 12-15 miles broad on the S.-W. coast of Ceylon, between Negombo, Colombo, and Matara, up to an elevation of 1,500 ft. A sandy soil is generally selected, but others may be chosen, such as a mixture of sandy with red soil, free from quartz, gravel, or rock; also red and dark-brown soils. Such land in a flat country is preferable to hilly spots. A rocky and stony subsoil is not adapted, as the trees would neither grow fast, nor yield a remunerative return. In making a plantation, the whole of the ground should be cleared, leaving a few trees 50-60 ft. apart. The felled trees should be well lopped, burned, and cleared away. The stumps and roots, after burning, may be allowed to remain, in order to save expense of carriage, merely observing some degree of order in their disposition, by forming regular rows. Holes are dug 8-10 ft. apart and 1 ft. sq.; the distance between the plants depends upon the nature of the soil: the poorer the soil, the nearer should the trees be planted, and *vice versa*. Should the holes be intended for cinnamon roots, or stumps, the latter must be carefully removed with as much earth as can be carried up with them, and placed in the holes, taking care not to return the earth removed originally in digging the holes, but filling them with the soil scraped from the surface, which has been previously burned, exposed, and formed into manure. Should no rain fall after placing the roots in the holes, the stumps are well covered. and watered morning and evening, until the sprouts shoot out fresh buds, which will be in a fortnight or so from the time of transplanting; watering may then be discontinued. In a month, the new shoots will be 3-4 in. high, much depending upon the weather. If the holes be intended for young plants or seedlings, the latter are removed with boles of earth from the nurseries, and placed in the holes, taking the same care as with the stumps, both in watering and covering, in the event of its being dry weather. The coverings should not be removed until the plant throws out a new pair of leaves from the buds, which is a sign of their having taken root. When a plantation is formed of old stumps, all the branches are cut down to within 6 in. from the ground; this should be done with one stroke of a sharp instrument, in order to avoid the splitting of the stem. From these stumps, cinnamon may be cut and peeled in 12-18 months from the time of transplanting. From seedlings no crop can be expected before 2-3 years from the date of the transplanting, when there will be but single trees. These, when cut down as already observed to 4-6 in. above the ground, ought to be covered with fresh earth gathered from the space between the rows, and formed in a heap around the base. The next crop will be 3-4 times as much as the first, from the number of sprouts the stem will throw out, and so on every year, the crop increasing according to the number of sprouts each stem will throw out yearly from the cuttings. In the course of 7-8 years, the space left between the rows will only admit the peelers and weeders, as the branches from opposite bushes will almost touch each other. The plantation must be kept clean and free from weeds. Cinnamon requires no manuring; but when weeding, the roots of the bushes should be covered and heaped up with the surface soil, this being done as soon as the cinnamon sticks are removed for peeling. The plantation requires weeding 3-4 times a year during the first 2-3 years, then twice a year will answer the purpose.

For the nursery, a space of ground is selected in rich soil free from stones. The whole brushwood is cleared, leaving only the large trees for shade; all stumps, stones, and root sare removed, and the place is well dug 6-8 in. deep, and formed into long beds 3-4 ft. wide; the seeds are sown 9-12 in. apart, and shaded at 8-12 in. above the ground by a *pandal* of leaves; they are watered on alternate days until they have one pair of leaves, and the watering is continued in very dry weather; but the shade is not removed until the plants are 6-8 in. high, and can bear the sun. These seedlings will be ready for transplanting 3 months after the time when they were sown. Nurseries are made just before the close of the year. When this is done first, the land is prepared during the dry season, from December to March, both inclusive. April sets in with heavy rain generally in Ceylon and the weather continues wet till September-October. The cinnamon seeds are gathered when fully ripe, and heaped up in a shady place; the outside red pulp then rots and turns quite black, allowing the seeds to be trampled out or otherwise freed from the decomposed pulp; the seeds are well washed in water (just as is done to cherry coffee, before making into parchment in the white shell), and dried in the air without exposure to the sun. Seeds that float on the surface of the water should be rejected. The quality of the bark depends upon its situation on the branch: that peeled from the middle of the bush or branch is the best or "1st" sort; that taken from the upper end, the "2nd"; while that obtained from the base of the branch, or the thickest end, is called the "3rd" sort. The peeling process commences early in May, and continues until late in October. When a Chilaw* perceives a shoot of a proper growth, he strikes a small bill-hook (*catty*) obliquely into the shoot, and gently opens the gash to discover whether the bark separates freely from the wood; should this not be the case, he leaves the sucker for a future time. Some shoots never arrive at a fit state for decortication. Those which are cut are usually ½-¾ in. diam., and 3-5 ft. long. They are tied in bundles, and carried to sheds appropriated to the preparation of the cinnamon.

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* Should be Chaliya.—COMPILERS.

Being cleared of small shoots and leaves, two longitudinal slits are made in the bark, which is gradually loosened by the convex side of a peculiar knife (*mama*), and then usually half the circumference of the bark comes off in one entire slip. When the bark adheres firmly to the wood, it is strongly rubbed with the handle of the peeling-knife, until it is disengaged and stripped off. The sections of the bark thus obtained are carefully telescoped one into the other, collected into bundles, and firmly pressed or bound together. In this state, they remain for 24 hours, or more, thereby facilitating the subsequent removal of the cuticle. The interior side of each section of bark is placed on a convex piece of wood, and the epidermis, together with the greenish pulpy matter immediatly under it, is carefully scraped off by a curved knife. This is an operation requiring some nicety, for if any of the outer bark be allowed to remain, it gives an unpleasant bitterness to the cinnamon. In a few hours after the removal of the cuticle, the pieces are put one into the other till they form almost solid sticks about 40 in. long. On the first day, they are suspended under shelter upon open flat forms; on the second day, they are placed on wickerwork shelves and exposed to the sun. When sufficiently dry, they are made up into bundles of about 30 lb. each, which previous to shipment, are subjected to a process of assortment. For export to Europe, the bark of large shoots or thick branches, producing coarse cinnamon, and that of very young and succulent shoots, possessing little flavour, is rejected, and used for the preparation of the essential oil.

The peculiar tendency of cinnamon to deteriorate in new localities, coupled perhaps with the absence of due care and experience, has rendered it impossible to produce the spice equal to the Cingalese article anywhere outside that island. It is most nearly approached by that grown in S. India, known as "Malabar," "Tinnevelly," or "Tellicherry," and valued at 1s. 5d.—2s. 4d. a lb. In the Seychelles are said to exist 2,000 acres of cinnamon shrubs, which are utilized solely as firewood. In Dominica also the plant is found commonly in a wild state. Brazil and French Guiana afford insignificant quantities of a very inferior cinnamon. But Java occupies an important position as a producer of this spice. The culture and preparation do not differ essentially from the methods practised in Ceylon, but the packing is usually effected in wooden cases, and black pepper is said to be sprinkled among it to preserve the flavour. The export from Java in 1879-80 were:—638 *piculs* (of 135½ lb.) to Holland, and 24 to Australia.

CINNAMON.

(*From "Materia Indica," by Whitelaw Ainslie,* M.D., M.R.A.S.)

CINNAMON.—*Karruwa puttay* (Tam.) *Kulmie darchinie* (Duk.) *Darchinie* (Pers. and Hind.) *Kurundu* (Cyng.) *Sanalinga putta* (Tel.) *Kaimanis* (Malay.) *Daraṣita* (Sans.) *Caneel* (Dut.) *Canella* (Port.) *Darsini* (Arab.) *Canelle* (Fr.) *Kanohl* (Ger.) *Kinamon* (Greek.)

LAURUS CINNAMOMUM (Lin.)

Cl. and Ord. Enneandria Monogynia. Nat. Ord. Oleraceæ. *Zimmtlorbeer*. (Nom. Triv. Willd.) See Spec. Plant. Willd. vol. ii. p. 477.

This fragrant, pleasant tasted, and pungent aromatic bark, is a favourite medicine of the native practitioners of India, who consider it as tonic, cordial, and stimulant, and give it in doses of from eight grains to a scruple.

From the bark there is prepared by maceration in sea-water and then distilling with a slow fire, an essential oil, which in Ceylon is considered as of great efficacy as a rubefacient in cases of sprains.

The greater part of this aromatic bark which is brought to India, is the produce of Ceylon, where it grows in great abundance in many parts of the island; it is also now an article of trade from several of the eastern islands, especially *Borneo.*[*] It is cultivated at *Quang-sy* in China, and of a very fine quality in the central mountains of *Cochin China.*. (See Voyage á Pekin par M. de Guignes.) It has lately been found to arrive at tolerable perfection in sheltered[†] situations in Lower India; and De Comyn says, in his "State of the Philippine Islands," that the cinnamon plant is found in its native state in the interior of Peru, and when carefully cultivated not inferior to that of Ceylon (see work, p. 25.); and it is well-known that the plant in the same dominions is quite common in the woods of Mindano. Niewhoff found it in China in the Province of Quangsi in the year 1655.

There are ten varieties of cinnamon known in Ceylon, but of these the *Scholias* only bark four, *viz.*, the *rasse kurundu*, *nai kurundu*, *kapuru kurundu*, and *cabette kurundu*, the first is reckoned the finest, and the *cabette* the worst.

The tree seldom rises above the height of fifteen feet; the leaves stand in opposite pairs on short petioles, and are from four to seven inches long, oblong, pointed, and tri-nerved; the flowers, which are in axillary and terminal panicles, are white, but without odour.

The *laurus cinnamomum* with six other species are growing in the botanical garden of Calcutta; it is the *katu karua* of Rheed (Hort. Mal. 5. p. 105, t. 53), and is described in the Flor. Zeyl. 145, and Burm. Zeyl. (62. t. 27.)

Sintok, Dr. Horsfield tells us, in his "Account of Java Medicinal Plants," is the Java name of a species of *laurus*, which in taste is an agreeable aromatic mixture of the clove and cinnamon ; the best comes to Java from the Moluccas.

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[*] See Leyden's Sketches of the Island of Borneo, vol. vii. Transactions of the Batavian Society.

[†] At Courtalum in the Tinnevelly district.

It would appear that cinnamon was in former times not confined* to Asia, much less to the island of Ceylon. Pliny informs us (lib. xii. cap. 19) that it grew in Ethiopia, and we know "that Vespasian on his return from Palestine, dedicated to the Goddess of Peace in one of the temples of the capitol, garlands of cinnamon inclosed in polished gold; and that in the temple built on Mount Palatine by the Empress Augusta in honour of Augustus Cæsar her husband, was placed a root of the cinnamon tree set in a golden cup." (See Phillip's History of Cultivated Vegetables, vol. i. p. 152.) Celsus recommends that it should be given "per potionem." (lib. v. p. 261.) In the Philippine Island there is a tree called *calingad*, the bark of which tastes exactly like cinnamon. (See De Comyn's State of those Islands, p. 27.)

CINNAMON.

(*From " Treasury of Botany," by John Lindley and Thomas Moore.*)

CINNAMOMUM.—The trees furnishing Cinnamon and Cassia barks belong to a genus of *Lauraceæ*, or true laurels, characterised by the presence of ribbed leaves, leaf-buds not provided with scales, a six-cleft leathery calyx, nine fertile stamens in three rows, with four-celled anthers which open inwardly, except those of the third or innermost row, which open towards the outside of the flower. The stamens of this third row are moreover provided with two sessile glands, one on each side of their base, and within them is a fourth row of abortive stamens. The fruit is berry-like, one seeded, in a cuplike calyx.

C. zeylanicum is largely cultivated in Ceylon, for its bark, which furnishes the best Cinnamon. The bark is stripped off the branches, when it rolls up into quills, the smaller of which are introduced within the larger and then dried in the sun. The thinner the bark is as a rule, the finer its quality. Cinnamon is largely used as a condiment for its agreeable flavour, while its astringent and cordial properties give it a medicinal value. It is said to possess the special property of restraining uterine hæmorrhage.

C. Cassia furnishes Cassia bark, which is much like cinnamon, but thicker, coarser, stronger, less delicate in flavour, and cheaper ; hence it is frequently used to adulterate cinnamon. Its admixture, however, can be readily detected, even in a powdered state, according to Dr. Hassall. Cassia is grown in China, Java, &c. The German and Russian chocolate-makers prefer cassia to cinnamon, as affording a stronger flavour. The same, or some closely-allied trees, furnish Cassia buds, which are something like cloves, and, like them, consist of the unexpanded flower-buds ; but they possess properties similar to those of the bark.

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* Hippocrates notices cinnamon, lib. ix. cap. 5. Theophrastus in his Hist. Plantar. lib. ix, cap. 5. So does Dioscorides, lib. i. cap. 13.

Other species of this genus afford aromatic barks: such as *C. Culilawan*, a native of Amboyna, whose bark has a flavour of cloves. *C. iners*, a native of Malabar, is employed medicinally in fevers and dysentery; the seeds are the parts used; the bark is likewise employed as a condiment. The leaves of *C. nitidum*, dried, are said to have furnished the aromatic leaves called 'folia Malabathri'; indeed, it is surprising that the leaves of the cinnamon are not more often imported, as they, like the inner bark, though to a less extent, contain the volatile oil on which the fragrant aromatic properties depend.

[M. T. M.]

CINNAMON.—*Cinnamomum zeylanicum*, a tree cultivated in the tropics for its aromatic bark. —, Bastard. *Cinnamomum Cassia.* —, Black. *Pimenta acris.* —, Isle of France. *Oreodaphne cupularis.* —, Santa Fè. *Nectandra cinnamomodies.* —, Wild. *Canella alba*; also *Myrcia acris.*

CASSIA BARK.

(*Cinnamomum Cassia.*—LAURACEÆ.)

(*From "Cultural Industries for Queensland," by Lewis Adolphus Bernays,* F.L.S., F.R.G.S.)

This is a native of all the countries to which the true cinnamon is indigenous, and has a still wider habitat than that tree. It is a larger tree, attaining a height of sixty feet, and has a very wide spread of branches—in other respects very much resembling the cinnamon. The leaves are deep green on the upper and grey on the lower surface, the flowers being somewhat more bell-shaped than the other. It likes similar soil and treatment to that which suits its more important and valuable relative; and, in fact, the two trees differ little from each other beyond the points above-mentioned, except as to the degree of the aromatic principle in the bark. In this respect the tree under notice is greatly inferior, the price of high-class cinnamon being double that of cassia bark. This latter is thicker in substance, less quilled, and breaks with a short instead of a splintery fracture. It is also far more pungent than cinnamon, and has a slimy, mucilaginous feel in the mouth when chewed. Most of the cassia bark imported comes from the East Indies, and it is principally used for the essential oil which it yields by distillation.

CINNAMOMUM.

(From Johnson's "Gardeners' Dictionary.")

Cinnamon. (From the Arabic name, *kinamon*. Nat. ord., *Laureis* [Lauraceæ]. Linn., 9-*Enneandria* 1-*Monogynia*.)

Cassia Bark is obtained from nearly all the species of Cinnamon-trees. Other countries have their Cinnamon-trees, but differing from

the true Asiatic Cinnamon. Stove trees. Cuttings of fine shoots in April, in sand, under a glass, and a moist bottom-heat. Peat and loam. Summer temp., 60° to 80°; winter, 55° to 60°.

C. Beiolgota (Beiolgota). 40. Yellow, green. E. Ind. 1818.
—*cassia* (cassia) 50. Yellow, green. June. Ceylon. 1763.
—*Culilaban* (Culilaban). 20. Yellow, green. E. Ind. 1823.
—*dulce* (sweet. *True Cinnamon*). 40. White, yellow. E Ind. 1820.
—*glaucum* (milkygreen. *Camphor-tree*). 20. Pale,yellow. Japan, 1800.
—*gracile* (slender). 20. Yellow, green. E. Ind. 1820.
—*Malabatrum* (Malabar-*leaf*). 20. Yellow, green. E. Ind. 1805.
—*montanum* (mountain). 40. White, green. W. Ind. 1810.
—*nitidum* (shining). 20. White. E. Ind. 1823.
—*verum* (true). 40. Green. July. E. Ind. 1768.

CINNAMON CULTIVATION IN THE HILL AND LOW DISTRICTS.

(*To the Editor of the "Ceylon Observer."*)

Veyangoda, 24th April, 1881.

DEAR SIR,—During the last few years planters, owing to the shortness of coffee crops, have given their attention to what is called new products. Amongst other things attention has been turned to cinnamon cultivation. A very great error has been made in cultivating this product. Plants have been put out singly on one estate in the hillcountry on which I was resident. The visiting agent, on one of his inspecting visits, suggested a field on which the coffee had gone out, to be planted with cinnamon. I was asked to make enquiries in the lowcountry as to cost of plants. Clumps of plants were then selling at R30 per thousand; that was considered too high, and my P. D., who was resident on the adjoining estate, during one of his frequent visits to Ambagamuwa, purchased plants at R10 the thousand and planted them out singly, one in each hole. When next I met him, I pointed out to him the great mistake he had made. The plants would, I said, be fit for cutting in about three years. Each stock would then put out a couple or so of suckers which in their turn will be fit for cutting in a couple of years. The clumps or bushes will thus be gradually pruned, and it would take ten or twelve years before the cinnamon will pay more than the cost of monthly weeding. My P. D. looked surprised and asked me why I hadn't told him so before. For the simple reason, I answered, that he had not consulted me. I have written so much, as I see, from time to time advertisements of cinnamon plants for sale, and as a warning to planters not to put out plants singly. It will never pay, especially as the quality of the cinnamon grown on thehills is inferior and is known as Corle cinnamon. The best use to **which such cinnamon can be put is to have it scraped into chips and** sold for the extraction of oil. Cinnamon seeds are generally sown in the lowcountry, in beds in which drills are made with the hand, and into which from 10 or 12 to a handful of seed is dropped. The more the seed the larger the clump, the sooner it will pay and the chances of the plants growing, as the outer ones protect the inner ones. It has been said in an old number of your Directory, in an article written evidently by that very able planter who now writes from the "Western Province," that it is next to impossible to make supplies good on our old estates. If the writer of the article in question were to visit the estate under Mr. Drieberg's charge at Ekella, he would no doubt be agreeably surprised to see acres and acres of supplies flourishing, by Mr. Drieberg sowing his seed in handfuls in drills. Finally it will be impossible for planters upcountry to put out plants in clumps, unless from nurseries on the estate, as the cost of carriage of so much soil with the clump will be ruinous.—Truly yours, B.

BRITISH PHARMACEUTICAL CONFERENCE.

RESULTS OF EXPERIMENTS MADE UPON THE BARKS OF CINNAMON AND CASSIA, ALSO UPON THE OILS EXTRACTED THEREFROM.

By J. Woodland, F.L.S., F.C.S., etc.

Wishing to ascertain, if possible, the substance which causes an iodized decoction either of cinnamon or cassia to lose its blue colour, I made experiments upon the known constituents of the drugs with the result of finding that the volatile oils possess the property of absorbing iodine to a considerable extent, which peculiarity the other known constituents of the drugs seem to lack, and as far as the experiments made at present determine, the oils are the only constituents having that decolorizing power,

The oils of cinnamon and cassia both take away the blue colour imparted by iodine to a decoction of starch, and that of the former drug possesses this property to a much greater extent than is the case with that of cassia, although not in any constant proportion, the amount of iodine that is absorbed by the oils being dependent upon the age of the sample in an inverse ratio, as the greater the age of the oil the smaller is the quantity of iodine solution absorbed by it. This decolorization is more especially seen when the oil and iodine are dissolved in the same medium, such as rectified spirit or carbon bisulphide; but if the oil be diffused in water, and iodine solution with starch paste added, although the decolorization takes place quickly at first, yet after a time it proceeds but slowly, owing to the imperfect contact of the reacting agents. Iodine also dissolves in both of the oils, more quickly in that of cinnamon; and if the iodine be in excess, it imparts to the solution in oil of cinnamon a rich reddish-brown colour, whilst the more slowly formed solution in oil of cassia has a dull greenish-brown colour, with a very slight appearance of red after shaking.

The quality of cinnamon or cassia bark being dependent upon the amount of oil contained therein, it occurred to me that samples of these barks might have their value approximately determined by treating infusions or decoctions of them with a standard solution of iodine, and accordingly experiments were made which show that although the quality of a bark of cinnamon or cassia can be quickly ascertained, the total amount of oil will not be indicated on account of the time taken by the oil to absorb the iodine. Decoctions of commercial samples of the powdered drugs were made, 1 gram of each being taken, and four of them absorbed a decinormal solution of iodine in the following quantities:—

Cinnamon.	*Cassia.*
No. 1 took 6·9 c. c. to impart a coloration.	No. 1 took 3·7 c. c.
,, 2 ,, 4·5 ,, ,, ,,	,, 2 ,, 2·1 ,,
,, 3 ,, 4·9 ,, ,, ,,	,, 3 ,, 3·3 ,,
,, 4 ,, 11·8 ,, ,, ,,	,, 4 ,, 2·3 ,,

The iodine solution was added until, after shaking well, a distinct colour was seen in the froth. Of the four samples of cinnamon, numbers 2 and 3 were poor ones, as there was not much odour emitted by them, and from these and other experiments made, a sample of an average quality ought, if 1 gram be boiled with water and then cooled, to take at least 6 c. c. of a decinormal solution of iodine to colour the froth. Cassia bark requires a much smaller amount of iodine to colour the froth, first, on account of the oil not absorbing so much as before-mentioned; and, secondly, on account of the bark containing a smaller percentage of oil.

In ascertaining if there is any other ingredient or principle in the cinnamon bark which absorbs iodine, great difficulty was experienced in expelling the whole of the volatile oil, for after boiling the powder with a strong solution of salt for four hours, the odour of the oil was still perceptible, and the decolorizing properties still evident. Hence I conclude that a considerable quantity of this ingredient must be left behind after the distillation of the bark with salt water, as I am informed is the process in Ceylon * and I should like to have the experience of anyone who has witnessed the operation, there or elsewhere, related.

After trying various chemicals, I found that litharge liberates the oil to the largest extent, and also the most quickly, but as with the others, incompletely, although whether its action is chemical or physical, I am not prepared to say. The oil was finally got rid of by boiling the powdered bark for a considerable period with a strong brine, afterwards with a small percentage of slaked lime to convert the residue of the oil into cinnamate of calcium, and on acidifying one portion slightly with acetic acid and adding iodized starch, the colour was not removed, and no odour was perceptible on heating; through the other portion carbonic anhydride was passed, to convert any slaked lime into the carbonate, which was then boiled, and to the cool decoction iodized starch added with a negative result. These experiments lead me to suppose that the oil is the ingredient that alone possesses the decolorizing property, but what compounds are formed beyond that of hydrolic acid when the oil and iodine combine I am not at present able to state.

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* As in the case of the Sikkim cinchona bark.—COMPILERS.

The same difficulty was experienced in attempting to exhaust the drug of its oil with benzol, carbon, bisulphide, chloroform, ether, rectified spirit, and alcohol, although they were used both hot and cold as the residue when slightly heated invariably gave off the odour of the oil, and a decotion bleached iodized starch paste.

It having recently come to my knowledge that oil of cassia is substituted for oil of cinnamon, a few experiments were performed, by some of which a distinction can be made between the two oils. If nietric acid sp. gr. 1·36 be added to oil of cinnamon (1 part of the latter to 2 of the former), and the mixture shaken, a bright orange-coloured liquid is first obtained, upon the surface of which floats an orange resinous substance which slowly becomes deeper in colour until a beautiful cherry-red colour is visible, by which time it has changed to a liquid that floats on a lighter coloured substratum, which also in a short time becomes nearly of the same tint, bubbles then commence to appear, and shortly afterwards spontaneous ebullition occurs with the evolution of nitrous fumes, and vapours of benzoic aldehyde; by the time this ebullition has ceased, the amber coloured liquid commences to clear itself, and finally a *clear* amber liquid is left, with orange globules floating on the surface.

Upon oil of cassia nitric acid sp. gr. 1·36 has quite a different action, as after mixing 1 part of oil of cassia with 2 of nitric acid, a dirty green supernatant resinous mass (slowly turning brown) is seen floating on a yellowish liquid, and no further change is undergone; if a large excess of the acid be added after the first addition, the resinous mass changes to a deep reddish-brown, and the subnatant liquid takes a cherry-red colour. The same reaction occurs if a large excess of nitric acid be added to oil of cassia at first, but in neither of these cases is there any spontaneous ebullition or evolution of the nitrous fumes and benzoic aldehyde vapours.

If oil of cassia be mixed with oil of cinnamon the reaction with nitric acid takes place as with oil of cinnamon, but more tardily, according to the amount of cassia oil present, and at the end of the process a *turbid* subnatant liquid is seen instead of a clear one, as is the case with pure oil of cinnamon.

Spirit of nitrous ether can also be used to distinguish between these oils, as it forms a clear solution with that of cinnamon, but a turbid one with that of cassia.

Distinction can also be made between the powders of cinnamon and cassia, for on shaking cinnamon powder with iodine water, a greenish brown colour only is seen, whilst cassia powder treated similarly imparts a black colour. A better way, however, is to make a decoction of the powder and, when cold, add tincture of iodine in excess when on shaking well in a test-tube the froth of the cinnamon decoction is distinctly yellow, and that of cassia grey or black, and if cassia powder be mixed with cinnamon, the characteristic froth of the cassia can be distinctly seen.

A vote of thanks was passed to the author of this paper.

Professor Attfield hoped that the author would continue his experiments with the view of ascertaining the special conditions under which this substance would absorb iodine. The absorption of iodine by essential oils was a matter involved in a good deal of obscurity. The amount absorbed appeared to depend a good deal on conditions, and if Mr. Woodland would look into those conditions, it was possible he might be able to give a good method of distinguishing between these substances.

Mr. Brady said with regard to the employment of salt water in the distillation of oil of cinnamon, he had seen a statement to that effect in Pereira's 'Materia Medica,' and it had been repeated elsewhere, but he did not think that salt was employed generally in Ceylon.* In the only distilling establishment he visited, not only was salt water not used, but the distilled water was used again and again, for a manifest economic reason.

Mr. Greenish said he had heard Mr. Brady state that there were several kinds of cinnamon,—eight or ten; he should like to know whether the particular kind of cinnamon used in these experiments was noticed, because naturally it would have an influence on the result.

Mr. Brady said the different kinds were merely planters' varieties; he did not think anyone could define them. A planter would be able to tell the different sorts, but did not think there were even commercial names for them.

Mr. Greenish asked if there were any mode of distinguishing them.

Mr. Brady replied certainly not except by an expert. It was more like commercial sorting than botanical separation.

Mr. Greenish said probably it would have an influence on the result of experiment.

Mr. Brady said practically oil of cinnamon was made by the poorer planters, usually half-caste Portuguese, who would not take the trouble either to cultivate the shrub properly or to prepare the bark for sale as fine cinnamon, and it was quite a question whether growing the finest cinnamon really paid the planters so well as using it in the rough condition as chips for distilling the oil.

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* We remember making inquiries at the instance of late Mr. Henry Mead, and we were distinctly informed that salt never was used.—COMPILERS.

COST OF COCONUT AND CINNAMON CULTIVATION IN CEYLON.

(*From the "Tropical Agriculturist," March, 1888.*)

I suggested to my Colombo friend that if he were an American, intsead of a Sinhalese, by birth, and had some capital to invest, he would probably look about and find twenty more fathers of boys or girls, of his own nationality, religion, and social status, and pool say £500 each. This would give a joint capital of £10,000, with no interest to pay. They would then find a thoroughly competent native manager; and by giving him besides his salary, a certain share in the profits, identify his interests with their own. They would buy of Government a block of 2,000 acres, of which 750 would be planted with coconuts, 750 with cinnamon, and the other 500 held as a reserve. Roads would be opened, and the estate either marked into twenty plots, one for each shareholder, or if it were to be managed as one estate, then twenty good building plots would be laid out at the centre of the property, and a village formed. Some time ago I got the native manager of just such an estate to sit down with me and make the calculation I am now going to lay before you. It was an estate that had failed in the hands of an European capitalist. He was an absentee, his manager cooked the accounts, the kanganies cheated the manager, the coolies stole products from under the noses of both, and so it at last came under the hammer and into native hands. There were several partners and a good practical man to manage under their personal supervision. The result was that within five years the estate paid for itself, and now the owners can meet the market, whatever it may be, and still make money. The manager's figures may be faulty—I cannot vouch for them—but at least I have had them endorsed by several native estate owners of my acquaintance, whose signatures are known at the Madras Bank and the O. B. C. Here they are:—

Investment of a capital os £10,000, contributed by 20 proprietors in sums of £500 each.

Dr.		£.	s.	d.
To Purchase of 2,000 acres of coconut and cinnamon land, at R15		3,000	0	0
,, Surveying		75	0	0
,, Making roads (which require 20 acres) ...		200	0	0
,, House for superintendent		50	0	0
,, Clearing 1,500 acres at R5 (net, exclusive of timber sold off)		750	0	0
,, Plants for 750 acres coconuts (75 per acre) ...		281	5	0
,, Plants for 750 acres of cinnamon (3,000 per acre at R2)		225	0	0
,, Setting 56,250 coconut plants at 3 cents ...		168	1	6
,, Planting 750 acres cinnamon at R1·25 ...		93	1	6
,, Holing and covering do.		131	0	6
,, Weeding 1,500 acres, 1st year, at £1 ...		1,500	0	0
,, 10 watchers at £1 per month		120	0	0
,, Superintendent's salary at £3 per month ...		36	0	0
Total coast at end of the 1st year		£6,629	8	6
Weeding, watchers and superintendence, 2nd year ...		1,656	0	0
Same for 3rd year, £1,656		£8,285	8	6
,, ,, 4th year, 1,656		3,312	0	0
Cr.		£11,597	8	6
By crop of cinnamon in the 4th year 562½ bales at R37·50 per bale...	£21,075			
Deduct cost peeling at R16	9,000			
		1,207	10	0
By Crop 5th year at 1 bale per acre, 750 bales, at same price		1,612	10	0
,, ,, 6th year the same		1,612	10	0
,, ,, 7th year, an increase of 25 per cent ..		2,015	10	0
,, ,, 8th year, same rate of increase ..		2,418	10	0
,, ,, 9th year, do.		2,821	10	0
,, ,, 10th year, at 3 bales per acre		3,225	0	0
,, First yield of coconuts on 750 acres at R24 nett ..		1,800	0	0
		£16,713	0	0
In the 15th year the income will be				
For Cinnamon	£3,225 0 0			
,, Coconuts	3,600 0 0			
		£6,825	0	0

—Cor. of *Ceylon Times*.]

[The figures look too good to be true. The market for cinnamon is not very promising, while coconuts were never cheaper than now. No allowance is made for part of the land turning out unsuitable for cinnamon or coconuts after planting, as in the case of the Horrekelly estate: 2,000 fullgrown coconuts per acre is, we suspect, a good average yield for a property of 750 acres, and therefore we would put £2,500 instead of £3,600 as the full income from this source. So with cinnamon, £1,000 off the above income would be a safer estimate, but even then the investment offers a very encouraging return—Ed. *T. A.*]